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THE CALENDAR

FOR THE YEAR

1913-1914

VOL. II

EXAMINATION PAPERS

OF

1913-1914

BOMBAY

1914

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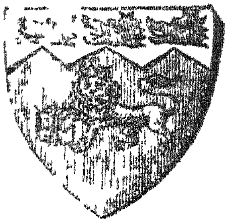

BOMBAY

MATRICULATION EXAMINATION, 1912.

MONDAY 11TH NOVEMBER.

[10.30 A.M. TO 1.30 P.M.]

ENGLISH (*Compulsory*).

N.B.—(1) Ten marks are assigned for general neatness, style and method.

(2) The two sections are to be answered in separate books.

SECTION I.

1. Paraphrase : 30

(*a*) On the green hill-top,
Hard by the house of prayer, a modest roof,
And not distinguished from its neighbour barn,
Save by a slender-tapering length of spire,
The Grandame sleeps. A plain stone barely tells
The name and date to the chance passenger.
For lowly born was she, and long had eat,
Well earned, the bread of service :—hers was else
A mounting spirit, one that entertained
Scorn of base action, deed dishonourable,
Or aught unseemly. I remember well
Her reverend image ; I remember, too,
With what a zeal she served her master's house.

(*b*) He pays off both scores of old friendship and new-acquired enmity in a breath, in one perpetual volley from his pen. However his own reputation or the cause may suffer in consequence, he cares not one pin about that, so that he disables all who oppose, or who pretend to help him. In fact, he cannot bear success of any kind, not even of his own views or party ; and if any principle were likely to become popular, would turn against it to show his power in shouldering it on one side. In short, wherever power is, there he is against it ; he naturally butts at all obstacles, and feels his strength only by resistance to the opinions and wishes of the world. To swim with the stream, to agree with the company, is not his humour.

2. Change the form of the following sentences as directed :—

(*a*) The difficulty was solved by means of a special service devised for the occasion.

(*Make the word* 'service' *the subject.*)

(*b*) I left him to his fate. He persisted in refusing help. I offered him help on all occasions. On such occasions he really needed help.

(*Combine into one complex sentence.*)

(*c*) The lady was compelled by the doctor to drink such vile medicine that she was all but killed by him.

(*Use the active voice throughout.*)

3. [illegible] 10

4. Put into the *Indirect Narration* :— 12

He said :—

(*a*) I shall come tomorrow and ask you if you have finished with that book.

(*b*) Go away! I do not want you now. You may come again tomorrow.

(*c*) What a lazy boy you are! How badly you have done your work!

(*d*) Where are you staying?

(*e*) Good morning! How do you do?

5. Punctuate and use capitals where necessary :— 8

hallon said i to the very small boy where do you live at chatham said he what do you do there said i i go to school said he i took him up in a moment and we went on presently the very queer small boy said this place we are coming to is gads hill where falstaff went to rob those travellers and ran away.

SECTION II.

6. Write about forty lines (some 350 words) on any *one* of the following subjects :— 40

(*a*) Indian fruits and flowers.

(*b*) A wrestling match.

(*c*) A tonga pony tells the story of his life.

(*d*) On being ill.

7. Make a précis of your essay (*i.e.* a condensation or summary of your essay) in about fifty words. 10

8. Analyse :— 10

When through life unblest we rove,
Losing all that made life dear,
Should some notes we used to love
In days of boyhood meet our ear,
Oh! how welcome breathes the strain!
Waking thoughts that long have slept,
Kindling former smiles again
In fading eyes that long have wept.

9. Make *five* sentences using the words *ship, milk, light, buoy, house* as verbs; and *five* other sentences using *run, flow, drink, hold, turn* as nouns. 10

MONDAY, 11TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANSKRIT.

N.B.—Answers to sections to be given in separate books.

SECTION I.

1. Translate into English :— 30

(*a*) आर्य नाथस्य यक्षाणां मणिभद्रस्यास्मि दुहिता तारावली नाम । साहं कदाचिदगस्त्यपत्नीं लोपामुद्रां नमस्कृत्यापावर्तमाना

आदाय चैनं तीव्रस्नेहान्मम पित्रोः संनिधिमनैषम् । अनैषीच्च मे पिता देवस्यालकेश्वरस्य स्थानम् । अथाहमाहूयाज्ञप्ता हरसखेन बाले बाले ऽस्मिन् कीदृशस्ते भाव इति । औरस इवास्मिन् वत्से वत्सलेति मया विज्ञापितः सत्यमाह वराकीति तन्मूलामतिमहतीं कथामकरोत् ॥

(b) वाजश्रवसस्य कश्चिन्नचिकेता नाम पुत्रो बभूव । स च वाजश्रवसेन यज्ञे वृद्धासु गोषु दक्षिणात्वेन कल्पितासु नैतया दक्षिणया पितुः सफलः क्रतुर्भविष्यतीति मेने । अतः स्वात्मप्रदानेन क्रतुं सगुणं करिष्यामीति विचार्य तात मां कस्मै प्रदास्यसीति पुनः पुनः पितरं पप्रच्छ । निर्बन्धक्रुद्धस्तु वाजश्रवसो मृत्यवे ददामीत्युवाच । तदनन्तरं च सत्पुत्रस्य यमाय दानं कथं कृतमित्यनुशयानं वाजश्रवसमालक्ष्य नचिकेतास्तमुवाच । क्षणमात्रावस्थायीदं शरीरं नात्रासक्त्या प्राचीनैरपि परिपालितं सत्यं परित्यक्तुं युक्तमतः प्रेषय मां यमं प्रतीति । तदनुज्ञया च यमसदनं गत्वा तिस्रो रात्रीरुवास । तथाभूतं नचिकेतसं दृष्ट्वा यतो मम सदने तिस्रो रात्रीरनश्नन्नुषितवानस्यतस्त्रीन् वरान् प्रार्थयेति तं प्रति त्रयो वरा यमेन दत्ताः ॥

Name and dissolve the compounds underlined.

2. Quote or frame sentences illustrating the uses of—

कच्च्, कामम्, धिक्, किमु.

3. Name in Sanskrit and dissolve the following compounds:—

अपराह्णः, हस्तपादम्, निर्मक्षिकम्, मुनिसत्तम, चतुःसूत्री, तत्परः, श्रुतपूर्वः.

4. Decline:—

(a) नौ, श्रोतृ (n.), सेनानी, and आशिस् in Gen. Plu. and Loc. Sing.

(b) उदच् (f.), पुंस्, धी, and वार् in Acc. Plu. and Inst. Plu.

SECTION II.

5. Give—

(a) Imperat. 2nd pers. sing. of—

रम् with वि, हु, विद् and मुष्.

(b) Perfect 1st pers. plu. of—

अश्. नह्. ईश्, and भी.

(c) Imperf. 3rd pers. sing. of—

स्तु, गृ with सम्, चक्ष्, and क्री with वि

(d) Second Fut. 2nd pers. dual of—

दह्, गम्, वृ, कृ (Caus.), and दृश् (Passive)

6. Name fully the forms underlined in the following— 10

शत्रुक्षयं विवित्सू राजा [illegible] निजग्मे । वृक्षमूल आसीनानृषीन् विक्षिपोऽस्तस्य यशः श्रवणैरगायि । तदा विश्वदृषिः सत्रान्निरगमत् । [illegible] इति सञ्चिन्त्य कुमाराः सर्वानविदन् । सुपुत्रे राज्यं विनिवेश्य स वनमाददे नित्यं पदं च प्रापत् । सोऽनेकः समेत्य स वीरः स्वबलमदीदृशत् । तमीशान मा भवान्नवनस्त । मोक्षपथमुपेयुषस्तान्नृपस्य इत्यब्रवीत् सः । [illegible] लघुकारिष्यता त्वया कोकत्रिनय कुक्षावद्दम ।

7. Translate into Sanskrit— 8

(a) The more you have of such friends the better will it be for you.

(b) Under these circumstances, there was no other help than a retreat.

(c) The king had the palace built by his workmen in not more than forty-two days.

(d) What is the use of being awake, when it is too late?

8. Translate into Sanskrit observing the rules of Sandhi— 20

Three little children went into a large forest, one day, in order to seek flowers and birds' nests. Their father had warned them not to go too far into the forest, lest they should not find their way again. But they did not obey, and they lost themselves. When night came, they were very frightened, but the eldest of them told his brother and sister, that their father would seek them. For two days and two nights, the father and all *his neighbours sought for the poor children, but in vain. Then a kind* forester accompanied them to the forest, and pointed out to them places where the children had walked. He soon found them lying near a bush, exhausted with cold and hunger. The joy of the father knew no bounds, when he found that they were not dead.

MONDAY, 11TH NOVEMBER.

[2-0 P.M. TO 5-0 P.M.]

LATIN.

1. Translate into English— 30

(a) Etsi multis [illegible] in Italiam revocabatur, tamen constituerat nullam partem belli in Hispaniis relinquere. Itaque duabus legionibus missis in ulteriorem Hispaniam cum Q. Cassio, tribuno plebis, ipse cum sexcentis equitibus magnis itineribus progreditur, edictumque praemittit, ad quam diem magistratus principesque omnium civitatum sibi esse praesto Cordubae vellet. Quo edicto tota provincia pervulgato, nulla fuit civitas quin ad id tempus partem senatus Cordubam mitteret, nullusve civis Romanus paulo notior quin ad diem conveniret.

[illegible] qui [illegible] Licinium [illegible] dimissum [illegible] quinque [illegible] Martio conjuravissent, [illegible] die data [illegible] Legati et ad P[illegible] [illegible] Plaetorium [illegible] Illyrios ad stipendium [illegible] [illegible] accipi[illegible].

2. [illegible] into Latin:— 15

(a) This lazy boy [illegible] to [illegible].
(b) When he comes he will tell [illegible] all that he did.
(c) We hope that the war [illegible] [illegible].
(d) He was permitted [illegible] his father [illegible] returned [illegible].
(e) The longer you [illegible], the more difficult it will be for you to depart.

3. (a) Give the gender, the ablative singular and the genitive plural of magister, ager, arx, manus, [illegible], comes, mos, facinus. 20

(b) Compare liber, niger, arduus, providus, nuper, cito, graviter.

(c) Distinguish between aedes in the singular and the plural, castrum and castra, summus and supremus, nescio quis loquitur and nescio quis loquatur, fugit and fugit, [illegible] and [illegible], paret and paret.

(d) Give the first plural future indicative active of jacio, jaceo, prosum, eo, the third singular imperfect subjunctive passive of capio, veto, fero, facio, and the future participle of fugio, fero, orior, vincio.

(e) Express in *Oratio Obliqua*.—Nihil existimare hunc esse exercitum qui Galliam Germaniamque devicerit. Omnibus interfui proeliis, nec temere incognitam rem pronuntio.

4. Translate into Latin:— 25

Antonius, when a young man, quitted Rome to study eloquence and the art of war in Greece, and on his return to Rome was created augur and tribune of the common people. When the rupture (discidium) took place between Caesar and Pompeius he declared that these two generals who commanded great armies in the provinces, ought to be deprived of their power, but he afterwards embraced the cause of Caesar and advised him to carry the war into Italy. After the murder of the dictator he made himself so popular that it is likely he would have succeeded to Caesar's power had not Cicero favoured his opponent Octavianus.

MONDAY 11TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HEBREW.

1. Point the following passage supplying necessary methegs and pauses, mark the accented syllables by means of a perpendicular line above them, and translate:— 1

אל ארך אפים ורב חסד ואמת אל באפך
תוכיחנו חוסה יהוה על ישראל עמך והושיענו
מכל רע חטאנו לך אדון סלח נא כרוב רחמיך
אל

2. Explain and illustrate the uses of אם and אֲשֶׁר.

3. (*a*) Explain, giving examples, how nouns are formed in Hebrew. 14

(*b*) What are the paragogic letters in Hebrew? Give, with examples, some of the uses of each of them.

(*c*) What are the substitutes for adjectives in Hebrew? Give examples.

4. Give :— 20

(*a*) the gender of :— חֶרֶב, לָשׁוֹן, תֵּימָן.

(*b*) the plural of :— בֹּהֶן, אֶשְׁכֹּל, גַּחֶלֶת, חֲנִית.

(*c*) the construct state of :— חִזָּיוֹן, בֵּן, עֵץ, חֶדֶר.

(*d*) with suffixes :— עוֹד, גַּי, עֵד.

(*e*) the feminine of :— תּוֹלָע, אָדוֹן, פַּר, חָם.

(*f*) the perfect and imperfect Hithpael of שׁמם and imperative Hiphil of דבק.

5. Translate into Hebrew :— 25

(*a*) None that put their trust in Him shall want for strength. Be not afraid of the words of a sinful man; for his glory shall be dung and worms. To-day he shall be lifted up, and to-morrow he shall in no wise be found, because he is returned unto his dust, and his thought is perished. And ye, my children, be strong, and show yourselves men in behalf of the law; for therein shall ye obtain glory.

(*b*) All the commandments shall ye observe to do, that ye may live, and multiply, and possess the land which the Lord sware unto your fathers. And thou shalt remember all the way which thy God led thee these forty years, to humble thee, to know whether thou wouldest keep His commandments, or no. Thy raiment waxed not old upon thee, neither did thy foot swell these forty years.

6. Translate and comment where necessary :— 10

(1) דָּמְךָ גַּם אַתָּה

(2) אֱלִילֵי זְהָבֶךָ

(3) וְקָרָא זֶה אֶל זֶה

(4) בְּקִרְבִּי זֶה הַנַּעַר

(5) אֲדוֹנִים קָשֶׁה

7. Translate into English :— 15

(*a*) יֵעוֹרוּ וְיַעֲלוּ הַגּוֹיִם אֶל־עֵמֶק יְהוֹשָׁפָט כִּי שָׁם
אֵשֵׁב לִשְׁפֹּט אֶת־כָּל־הַגּוֹיִם מִסָּבִיב׃ שִׁלְחוּ מַגָּל כִּי
בָשַׁל קָצִיר בֹּאוּ רְדוּ כִּי־מָלְאָה גַּת הֵשִׁיקוּ הַיְקָבִים
כִּי רַבָּה רָעָתָם׃ הֲמוֹנִים הֲמוֹנִים בְּעֵמֶק הֶחָרוּץ כִּי

קָרוֹב יוֹם יְהוָה בְּעֵמֶק הֶחָרוּץ׃ שֶׁמֶשׁ וְיָרֵחַ קָדָרוּ וְכוֹכָבִים אָסְפוּ נָגְהָם׃ וַיהוָה מִצִּיּוֹן יִשְׁאָג וּמִירוּשָׁלַ͏ִם יִתֵּן קוֹלוֹ וְרָעֲשׁוּ שָׁמַיִם וָאָרֶץ וַיהוָה מַחֲסֶה לְעַמּוֹ וּמָעוֹז לִבְנֵי יִשְׂרָאֵל׃ וִידַעְתֶּם כִּי אֲנִי יְהוָה אֱלֹהֵיכֶם שֹׁכֵן בְּצִיּוֹן הַר־קָדְשִׁי וְהָיְתָה יְרוּשָׁלַ͏ִם קֹדֶשׁ וְזָרִים לֹא־יַעַבְרוּ־בָהּ עוֹד׃ וְהָיָה בַיּוֹם הַהוּא יִטְּפוּ הֶהָרִים עָסִיס וְהַגְּבָעוֹת תֵּלַכְנָה חָלָב וְכָל־אֲפִיקֵי יְהוּדָה יֵלְכוּ מָיִם וּמַעְיָן מִבֵּית יְהוָה יֵצֵא וְהִשְׁקָה אֶת־נַחַל הַשִּׁטִּים׃ מִצְרַיִם לִשְׁמָמָה תִהְיֶה וֶאֱדוֹם לְמִדְבַּר שְׁמָמָה תִּהְיֶה מֵחֲמַס בְּנֵי יְהוּדָה אֲשֶׁר־שָׁפְכוּ דָם־נָקִיא בְּאַרְצָם׃ וִיהוּדָה לְעוֹלָם תֵּשֵׁב וִירוּשָׁלַ͏ִם לְדוֹר וָדוֹר׃ וְנִקֵּיתִי דָּמָם לֹא־נִקֵּיתִי וַיהוָה שֹׁכֵן בְּצִיּוֹן׃

(*b*) מִזְמוֹר לְדָוִד יְהוָה מִי־יָגוּר בְּאָהֳלֶךָ מִי־יִשְׁכֹּן בְּהַר קָדְשֶׁךָ׃ הוֹלֵךְ תָּמִים וּפֹעֵל צֶדֶק וְדֹבֵר אֱמֶת בִּלְבָבוֹ׃ לֹא־רָגַל עַל־לְשֹׁנוֹ לֹא־עָשָׂה לְרֵעֵהוּ רָעָה וְחֶרְפָּה לֹא־נָשָׂא עַל־קְרֹבוֹ׃ נִבְזֶה בְּעֵינָיו נִמְאָס וְאֶת־יִרְאֵי יְהוָה יְכַבֵּד נִשְׁבַּע לְהָרַע וְלֹא יָמִר׃ כַּסְפּוֹ לֹא־נָתַן בְּנֶשֶׁךְ וְשֹׁחַד עַל־נָקִי לֹא לָקָח עֹשֵׂה אֵלֶּה לֹא יִמּוֹט לְעוֹלָם׃

MONDAY, 11TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

ARABIC.

1. Translate into English :—

(1) زعموا انه كان بارض كذا تاجر — وانه اراد الخروج يوما الي بعض الوجوه ابتغاء الرزق وكان عنده مئة من حديدا — فاودعها رجلا من

ـ وذهب في وجهه – ثم قدم بعد ذلك
فجاء والتمس الحديد – فقال له صاحبه :
ه الجرذان – فقال : قد سمعت انه لا شيئي
ن انيابها للحديد – ففرح الرجل بتصديقه ما قال
ب – ثم ان التاجر خرج فلقي ولدا للرجل –
وذهب به الى منزله فجاء الرجل من الغد
ل عندك علم بابني – قال لما خرجت من
بالامس رأيت بازيا قد اختطف صبياً – فلعلّه
– فلطم الرجل علي راسه وقال – يا قوم هل
ورايتم ان البزاة تختطف الصبيان – فقال
، ارضا تاكل جرذانها مئة من حديدٍ ليس
ان تختطف بزاتها الفيلة – قال الرجل اكلت
ل وهذا ثمنه فاردده علي ابني

جبت للانسان في فخره   وهو غداً في قبره يقبر
صبح لا يملك تقديم ما   يرجو ولا تاخير ما يحذر

2. Translate into Arabic:—

A goat when about to leave her home charged her young ki
the door to nobody, till she herself should return. A wolf, no
charge of the mother, came and knocked at the door, and counter
voice of the goat said, 'I am your mother, open the door.' The
aware of the wolf's trick replied, 'If you show me your beard, I
the door'.

3. Distinguish between

علم and علمية (2) فاعل and اسم فاعل (3) فعل
and حرف مضارع (4) نفي and نهي (5) مستثنى
and مستثنى منفصل (6) متعدى and لازمي (7)
ـ and لبذهب (8) قاتل المشركون —
المشركين and قاتل المشركين – قاتل المشركين

4. (a) How many genders are there in Arabic and how are they distinguished?

(b) Give the gender of—

دهن - طالقة - شمس - عين - انف - ارض - سماء - [illegible]

(c) Give their plurals.

5. Decline the following nouns for three cases :— 7

ذو مال - بعلبك - مروان - فتى - مومنون - نبي - امرأتان

6. Give a list of— 6

الافعال القلوب and الافعال الناقصة

Explain their uses with examples.

7. Conjugate fully and explain the forms— 8

ليقتلن - قل - لم يقرء - لن يتم - كاتب

8. Write down the past tense of as many derivations مشتق 8
from حال and دعا as may be in use with their meanings.

9. Correct, where necessary— 10

انتهى عليه الخبر - ان زيد قائم - قاموا المسلمون - اعطني الدرهمان - يا طالبوا العلم لا تكسلن - قرات في المدرسة العالي - قال ملك العظيم

MONDAY, 11TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

FRENCH.

N.B.—The answers to each section must be written in a separate book.

SECTION I.

1. Translate into English :— 14

Beaucoup de bien avec peu d'argent.

Monsieur ! J'ai reçu votre lettre du quinze courant. Le récit que vous m'avez fait de votre situation m'afflige. Je vous envoie sous ce pli, un bon de dix louis d'or. Je ne prétends pas vous donner cette somme, je vous la prête seulement. En retournant dans votre pays avec une bonne réputation, vous trouverez sans doute quelque emploi, qui vous mettra par suite en état de payer toutes vos dettes. En ce cas, si vous rencontrez un honnête homme qui soit sans ressources, payez-moi en lui prêtant une pareille somme ; mais recommandez lui en même temps de s'acquitter à son tour de la même manière, dès que ses moyens (means) le lui permettront et qu'il en trouvera l'occasion. J'espère que mes dix louis passeront ainsi dans beaucoup de mains, avant de rencontrer un coquin qui les arrête au passage.

Agréez, Monsieur, l'assurance de mes meilleurs sentiments.

Franklin.

2. In answer to one of your friends, from whom you have received a letter at the beginning of this month, write in French (making use of the words of the question itself and of those of question 1) an answer to the following questions:— 8

(1) Quel jour avez vous reçu sa lettre?

(2) Où êtes-vous en ce moment, et qu'y faites-vous?

(3) Qu'avez-vous l'intention de faire si vous réussissez à votre examen?

(4) Que feriez-vous si votre père vous donnait cent roupies pour vous récompenser?

Begin and end as for a letter.

3. Give:— 6

(a) the comparative and superlative of peu, bon, bien, honnête, mauvais.

(b) the contrary of beau, [illegible] quelqu'un, trouver, espérer, une bonne réputation.

(c) the meaning of mes, mais, il met; retourner, revenir; la somme, le somme; un honnête homme, un homme honnête; battre, se battre; décider, se décider; sauver, se sauver.

4. Translate into French:— 16

(1) At what time will they come?

(2) They do not mention the time, but I suppose it will be between eleven and twelve o'clock.

(3) I wonder (se demander) why they did not inform you sooner of their visit.

(4) Their letter is dated Monday the 9th.

(5) That was the day before yesterday.

(6) Yes, but the letter was only posted on the 10th.

(7) What do you intend to do?

(8) To [illegible] and wait until they come.

5. Give the English for:— 6

(1) Le bien mal acquis ne profite jamais.

(2) Être d'accord, and se mettre d'accord.

(3) En venir aux mains.

(4) A l'avenir.

(5) N'aurait-il pas mieux valu pour Franklin de garder son argent, que de [illegible]?

(6) S'est-il [illegible] après lui avoir pris sa [illegible]?

SECTION II.

6. Translate into French:— 25

Two thieves having stolen an ass had driven it into a forest. There they consulted about the price, which they were to ask for it and about the share each one should receive. However, they could not come to an agreement, and soon they came to blows. Whilst they were thus fighting a third thief quietly stole (or crept) near to them, mounted (on) the beast and made off without being seen. After some time the combatants became aware of their loss, and resolved, but too late, to be of one mind in future. It would have been better still, if they had made up their minds not to steal any more; for, as this story also shows: Ill-gotten goods never prosper.

7 (a) Give the Feminine and Plural of "[illegible]" and [illegible] the different use of "celui" and "[illegible]". 8

(b) Mention the disjunctive form of the French Personal Pronouns, and explain the use of "y".

(c) Write in full the French cardinal Adjectives for 11, 12, 13, 14, 15, and point out two cases in which English ordinals must be rendered by cardinal Adjectives in French.

8 Translate the following, and account for the Mood or Tense of the Verbs in italics :— [illegible]

(1) Voilà bien trois mois qu'il *[illegible]*.
(2) Le train est en retard, il *aura eu* un accident.
(3) Je souhaite que vos efforts *soient couronnés* de succès.
(4) Travaillez de manière que vos parents *[illegible]* de vous.
(5) *Vive* l'Empereur !
(6) Le bonheur consiste *à faire* son devoir.

9. (a) Render the following sentences in English :—

(1) Ils se sont hâtés de (prendre) l'occasion aux cheveux.
(2) La santé de mon père (va) de mieux en mieux.
(3) La porte qui donne sur le jardin était grande (ouverte).
(4) Moins on a de soucis, plus on (est) heureux.
(5) Ne (faites) pas tant de façons !
(6) Il voudrait (savoir) à quoi s'en tenir.
(7) Il ne faut pas (courir) deux lièvres à la fois.

(b) Give the following forms of the Verbs put between brackets in 9 (a) :—

Infinitive Present; Perfect Indicative 3rd person singular; Preterite, 2nd person plural; Future Present, 3rd person plural; Subjunctive Present, 1st person singular.

MONDAY, 11TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

AVESTA AND PAHLAVI.

1. Translate into Avesta :— 5

(1) Bring it to me. (2) May it not come to you. (3) Give it to the men or to the women. (4) Woe is me. (5) Hail to thee.

2. Translate the following sentences and parse fully all the words contained in them :— 10

[illegible] (1)
[illegible] (2)
[illegible]

3. Rewrite the following sentences, substituting Pahlavi words of Iranian origin for the Semitic or non-Iranian words :— 10

[illegible] (1)
[illegible] (2)
[illegible] (3)
[illegible] (4)
[illegible] (5)

4. (*a*) Conjugate (1) [illegible] in the Imperative; (2) [illegible] (cl. 5) in the Imperat. Paras. and in the Imperf. Paras., and (3) [illegible] in the Indic. Pres. Passive.

(*b*) Decline [illegible] (neut.)

5. Transliterate and give different meanings of—

[illegible] — [illegible] — [illegible] — [illegible] — [illegible]

6. Express the following numbers in Pahlavi, both in figures and in words.—

19, 60, 713, 4657.

7. Translate into English.—

(*a*) [illegible]

(*b*) [illegible]

(*c*) [illegible]

8. (*a*) Translate into Avesta.—

They shall perform ceremonies for three days and nights with fire blazing, with Baresman strewn and with Haoma effervescing, in honour of the holy Sraosha whom Ahura-Mazda, the holy has made the opponent of Aeshma.

(*b*) Translate into Pahlavi.—

And if [illegible] you see a child ill-treated, if you see the bully's hand uplifted to strike, and you hear the little one raise a scream of terror, you know the scream is a prayer. You know the mother would answer it if she were there and she would snatch the child from the tyrant. But the mother is not there. You must take her place, you must shield her child. For when things go right in this world all we that are strong shall be as mothers and fathers to those who weep, or who lie sick or whose faces are pinched with hunger. And if their mothers could know, they would thank us for helping their children.

MONDAY, 11TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PERSIAN

N.B.—The two sections must be answered in separate books.

SECTION I.

1. Translate into English :—

از خداوندان درد و بلا عبرت گیرید و زیان
بهنگام را بهتر از سود بی هنگام دانید و با مردمان
در هر چیز مدارا کنید تندی مکنید و با دوست و
دشمن آشتی کنید هرگز پای از اندازه بیرون منهید
کارهارا باندازهٔ خود کنید و احسان را از کسی
دریغ مدارید و دست و زبان خود را همیشه نگاه
دارید و از کارهای ناپسند دور باشید و از همنشین
بد پرهیز کنید- هرکس از خدا نترسد ازاو بترسید-
بر چیز مردم مهربانتر از صاحبش باشید- حق والدین
نگاه دارید عهد بسته را مشکنید- هرکه علم بیشتر
دارد بزرگش دارید هرکه آموختن را ننگ دارد
انسان مشمارید- مردگان را بذکر خیر و رحمت یاد
کنید- پس از مرگ دوستان پدر را ترک مکنید-
حال خود بهر کس نگوئید- سخن بزرگتر از خود
نگوئید- بار خود بگردن دیگران نیفگنید- سخن
حق را از آسمان و زمین بزرگتر دانید- هرگز از
یاد خدا باز نمانید•

2. Enumerate and explain the different kinds of اضافت

3. Give, with meaning, the Arabic plural of :—

استاد - سوال - قیمت - کاتب - شاعر

4. Translate into English freely :— 1

(1) لوازم پیری در جوانی آماده کردن

(2) آب که از سرگذشت چه بسیار چه کم

(3) هرکه زر دارد زور دارد

(4) در خانهٔ مور شبنمی طوفان است

(5) اندر شوره زار تخم کاشتن

(6) جای کل کل باش وجای خار خار

SECTION II.

5. How is the Passive Voice formed in Persian? 5

6. (a) Show by diacritical marks the different readings of the following words, and give their meanings :— 1

شعر - سحر - انعام - گرد - ملک

(b) Give colloquial Persian words for the following :—
Ice-cream, Hotel, Railway, Parliament, Customs.

7. Give with meanings the derivations of :— 1

دبستان - لیلی - بازار - آخوند - دستور - دهقان - قبله - سالار - موبد

8. Translate into Persian :— 2

(i) You pronounce very well indeed.

(ii) I prefer tea to coffee without milk.

(iii) Let us go and take a walk through the town.

(iv) Do you wish to buy something?

(v) Is it cold to-day?
No, it is warmer than yesterday.

(b) The life of man in this world is, for the most part, a life of work. Every man worth calling a man should be willing and able to work. The honest labouring man finds work necessary for his sustenance; but it is equally necessary for men of all conditions, and in every relation of life. How can one be idle when others are busy? Work is the best of all educators; for it forces men into contact with others, and with things as they really are. Work with hope is a pleasure.

MONDAY, 11TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PALI.

N.B.—The answers to the two sections to be written in separate books.

SECTION I.

1. Translate into English:—

तस्मिं च काले हिमवन्तपदेसे एकस्मिं सरे कच्छपो वसति । द्वे हंसपोतका गोचराय चरन्ता तेन सद्धिं विस्सासं अकंसु । ते दळ्हविस्सासिका हुत्वा एकदिवसं कच्छपं आहंसु—सम्म कच्छप, अम्हाकं हिमवन्ते चित्तकूटपब्बततले कञ्चनगुहाय वसनट्ठानं रमणीयो पदेसो, गच्छसि अम्हाकं सद्धिं ऽति । अहं किं ऽति कत्वा गमिस्सामीऽति । मयं तं गहेत्वा गमिस्साम, सचे त्वं मुखं रक्खितुं सक्खिस्ससि कस्सचि किञ्चि न कथेस्ससीऽति । रक्खिस्सामि, गहेत्वा मं गच्छथा ऽति । ते साधू ऽति वत्वा एकं दण्डकं कच्छपेन डंसापेत्वा सयं तस्स उभो कोटियो डंसित्वा आकासं पक्खन्दिंसु । तं तथा हंसेहि नीयमानं गामदारका दिस्वा द्वे हंसा कच्छपं दण्डकेन हरन्तीऽति आहंसु । कच्छपो यदि मं सहायका नेन्ति तुम्हाकं एत्थ किं दुट्ठचेटकाऽति वत्तुकामो हंसानं सीघवेगताय बाराणसिनगरे राजनिवेसनस्स उपरिभागं संपत्तकाले दट्ठट्ठानतो दण्डकं विस्सज्जेत्वा आकासंगणे पतित्वा द्वेभागो अहोसि । कच्छपो आकासंगणे पतित्वा द्वेधा भिन्नो ऽति एककोलाहलं अहोसि । राजा बोधिसत्तं आदाय अमच्चपरिवुतो तं ठानं गन्त्वा कच्छपं दिस्वा बोधिसत्तं पुच्छि—पण्डित किं ऽति कत्वा एस पतितोऽति ।

2. Decline fully:—

राज, तुम्ह, इत्थि, किं (*m.* and चक्खु (*n*).

3. Name and dissolve the following compounds:—

वत्थाभिलन्धनादीनि, पोराणकपण्डिता, विनिच्छयामच्चो, दिसापामोक्खाचरियो, मरणाकारपत्तो, उलूकसकुणो, and वत्थालङ्कारं.

4. Give the *Sanskrit* equivalents of—

तिणं, पुप्फमुट्ठि, ठानं, अम्बपक्को, अच्छरियं and सद्धिं.

SECTION II.

5. Give.—

(a) the Potential and Future of—

कर and अव + गम.

(b) the Present and Past of दा 'to give' and कथ्.

6. Frame sentences of your own using the following indeclinable words in them:—

पट्ठाय, सचे, एवं, यथा and हि.

7. Separate the following words:—

चिरत्थु, त्याह, [illegible], इच्चेकचे, यदायसं, यत्थूसभो, अग्गीव.

8. Translate into Pali: 2

There was a landowner who lived at Sāvatthi. One day, his son sitting on his hip asked him what is called the "Door" question. He replied, "That question requires a Buddha, nobody else can answer it." So he took his son to Jetavana, and saluted the Master. "Sir," said he, "as my son sat on my hip, he asked me the question called the 'Door'. I didn't know the answer, so here I am to ask you to give it." Said the master, "This is not the first time, layman, that the lad has been a seeker after the way to accomplish his ends, and asked wise men this question; he did so before, and wise men in olden days gave him the answer."

TUESDAY, 12TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HISTORY AND GEOGRAPHY.

N.B.—The two sections are to be answered in separate books.

SECTION I.

1. Sketch the characters of (a) Henry V and (b) Charles II.

2. "The reign of Elizabeth was a glorious period in English history from many points of view." Justify this statement. 1

3. (a) Explain the reason which led the Younger Pitt to join the war against France during the Revolution. 1

(b) Mention the evils which the Reform Bill of 1832 was intended to remedy.

4. How do you explain the rise and rapid success of the Mahratta power under Shivaji?

5. (a) Trace the course of events that led to the Treaty of Bassein and discuss its consequences. 1

(b) Give an account of the annexation of Sind.

6. By what [illegible] did [illegible] his annexation policy? 10

Mention the various measures of reform [illegible] as administration.

7. (a) What is meant by [illegible] 10

The Far East, [illegible], the Balkans, the Archipelago, the New World, the Emerald Isle.

(b) Describe the [illegible] route from England to India [illegible] the opening of the Suez Canal.

SECTION II.

8. Name and give a short account of (a) a general, (b) a finance minister and (c) a man of letters of the Court of Akbar. 12

9. Write short notes on:— 12

(a) The causes of the First Crusade.

(b) The origin of the title 'Prince of Wales'.

(c) The Young Pretender.

10. (a) Write a short geographical description of Tibet. Mention the principal mountain passes on the north-west frontier of India. 10

(b) Draw an outline map of the Bombay Presidency showing the most important towns.

TUESDAY, 12TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ENGLISH *(Optional)*.

N.B.—(1) Each section should be answered in a separate book.

(2) In assigning marks spelling, handwriting and method will be taken into consideration.

SECTION I.

1. Express fully the purport of the following passage in about 20 lines, using your own words all through:— 25

Caroline Helstone was just eighteen years old, and at eighteen the true narrative of life is yet to be commenced. Before that time, we sit listening to a tale, a marvellous fiction; delightful sometimes, and sad sometimes; almost always unreal. Before that time, our world is heroic; its inhabitants half divine or semi demon; its scenes are dream scenes: darker woods and stranger hills; brighter skies, more dangerous waters; sweeter flowers, more tempting fruits; wider plains, drearier deserts, sunnier fields than are found in nature, overspread our enchanted globe. What a moon we gaze on before that time! How the trembling of our hearts at her aspect bears witness to its unutterable beauty! As to our sun, it is a burning heaven—the world of gods. . . . . At eighteen, the school of Experience is to be entered, and her humbling, crushing, grinding, but yet purifying and invigorating lessons are yet to be learnt. Alas, Experience!

No other mentor* has so wasted and frozen a face as yours: none wears a robe so black, none bears a rod so heavy, none with hands so inexorable draws the novice so sternly to his task, and forces him with authority so resistless to its acquirement. It is by your instructions alone that man or woman can ever find a safe track through life's wilds; without it how they stumble, how they stray! On what forbidden grounds do they intrude, down what dread declivities are they hurled!

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*Mentor = tutor or guide.

Or

Expand the ideas in the following, using your own words, in not more than 20 lines:—

For shame, dear Friend, renounce this canting strain!
What wouldst thou have a good great man obtain
Place—titles—salary—a gilded chain—
Or throne of corpses which his sword has slain?
Greatness and goodness are not means, but ends.
Hath he not always treasures, always friends,
The good great man? three treasures, love and light,
And calm thoughts, regular as infant's breath;
And three firm friends more sure than day and night—
Himself, his Maker and the Angel Death.

2. Write a letter recommending your brother to a friend in Bombay with whom you intend your brother should reside with a view to attending a particular school. Make mention of your brother's good qualities. 14

3. Explain clearly the meaning of each of the following sentences:— 12

(*a*) This is a healthy book.

(*b*) Men are apt to worship the rising sun.

(*c*) It is no use painting the lily white or gilding refined gold.

(*d*) You are heaping coals of fire on my head.

(*e*) He is black-balled by society.

(*f*) Justice cannot have two weights and measures.

SECTION II.

4. Write an essay of about 40 lines on any one of the following subjects:— 32

(*a*) A happy home.

(*b*) Things of wonder and beauty around us.

5. Frame sentences to illustrate the correct use of:— 6

Many a, too many, one too many.
call upon, call off, call up;
Arab, Arabic, Arabian;
annual, annal, annuity.

6. Give 3 quotations each not less than 4 lines from 3 English poets; mention the author's name under each quotation and suggest a heading for each. 12

TUESDAY, 12TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

MARATHI.

1. Paraphrase in Marathi :— 5

न जें प्रिय सदोष तें प्रिय मनोगतें चांगलें
स्वतोक पितरां रुचे जरिहि कर्दमीं रांगलें ॥
तुलाचि धरि पोटिशीं कधि तदा यशोदा बरें
जरी मळविशी रजो-मलिन-काय तूं अंबरें ॥ १ ॥
प्रसिद्ध तुमचे महासदय पाय जीवांकडे
चुकी म्हणुनि होतिल क्षणाहि काय ते वांकडे ॥
न निष्ठुर पिता म्हणे मनिं न हो प्रजा रोषपी
अपथ्य-रुचि रुग्ण तो कटुक औषधें कोण पी ॥ २ ॥
असंख्य खळ संगरीं निजकरीं तुवां मारिले
न निष्ठुरपणें, कृपा करुनि ते भवीं तारिले ॥
जगज्जनक तूं, मुलें सकळ जीव, यां भातुकें
दटावुनिहि देशि बा अमृत नेदिजे घातुकें ॥ ३ ॥
सदा हि हित नायकों बहु अपाय केले करूं
तरी सकृप बाप तूं म्हणशि नायके लेंकरूं ॥
कधीं न करिशी प्रभो भजकबालकोपेक्षण
न तुजवरि ज्यापरी पशुप-पाळ कोपे क्षण ॥ ४ ॥

Or

तो मंडलाकृति फिरे उतरावयाला
भैमी-मुखेन्दु-परिवेष म्हणों तयाला ।
तेथें महीवरि असा खग बैसताहे
कीं सुंदरी निजकुतूहल जेवि पाहे ॥ १ ॥
जो बैसतां चपळ पक्ष-पुटीं धरेला
हाणीतसे फडफडां ध्वनि हो उदेला ।
पाहे तया खगवरासि वरानना हे
मानी मनीं नवलही मग बोलताहे ॥ २ ॥
असा पक्षी लक्षी बहु विहग-लक्षीं न मिळता
सुवर्णी जो वर्णीं वद कवण वर्णी कवयिता ।

अगाई हा बाई त्वरित वरि जाईल पळुनी
घरूं जातें हातें हळु हळु तयातें न कळुनी ॥ ३ ॥
ऐसें वदे मग तयास धरावया हे
तैं होय हंसगमना पहिलीच आहे ।
वाजेच ना वलय नूपुर-नाद नोहे
तो त्वद्गतीस निरखून कसा न मोहे ॥ ४ ॥
हे मंदमंदपद सुंदर कुंददंती
चाले जसा मद-धुरंधर इन्द्र-दंती ।
हंसा धरूं जवळि जाय कृशोदरी ते
निष्कंप-कंकण-करासि पुढें करी ते ॥ ५ ॥

2. Rewrite in a simpler style the following passage — 12

संस्कृत साहित्यशास्त्रकारांनीं वर्णिलेली आणि जुन्या महाराष्ट्र कवींनीं रूढ केलेली काव्यरीति आधुनिक कवींस बरीच साधलेली आहे, ही संतोषाची गोष्ट होय. काव्याच्या परिणामासंबंधानें जशी न्यूनता दृष्टीस पडते तशीच काव्याच्या क्षेत्रासंबंधानें अजून बरीच संकुचितता आहे. ही संकुचितता जाऊन काव्याचें क्षेत्र याहून विशालतर आपणास केलें पाहिजे. या विसाव्या शतकांत, व पाश्चात्य राष्ट्रांच्या वाङ्मयाशीं निकट संबंध झालेला असतां केवळ कूपमंडूकवृत्ति धरून उपयोग नाहीं; पाश्चात्य राष्ट्रांत काव्याविषयीं भावना आपल्याहून अधिक व्यापक आहे. पदलालित्य, कल्पनाचातुर्य, चमत्कृति, इत्यादिकांहून प्रतिभेच्या "रम्यनिर्माणशालिते" वर त्या वाङ्मयांत अधिक कटाक्ष आहे. तसेंच कवीला केवळ शब्दसृष्टीचें विधातृत्व न देतां या परमेश्वरसृष्टींत कवीला लोकनायकत्व, सृष्टिरहस्याचें व्याख्यातृत्व इत्यादि थोर अधिकार दिलेले आहेत.

3. Translate into English. 23

सर्व अवस्थांमध्यें तारुण्यावस्था विद्या शिकण्यास फारच योग्य होय; कारण, त्या वेळेस मनुष्याचें मन संसाराच्या काळजीनें अस्पृष्ट असतें. इतर गोष्टींकडे लक्ष पुरविण्याची गरज नसते. पाठ

करण्याची शक्ति फार थोडी असते. [illegible] विद्यार्थी मुद्दाम शिकण्यास योग्य असते. हेच मुलांच्या शिक्षणांत [illegible] वाटते. त्यामुळे [illegible] होणाऱ्या फायदा [illegible] अभ्यास न करणारे सुटतात. लहानपणीं मन शुद्ध असते, [illegible] सांगितलें त्याचा ठसा त्यावर चांगला उठतो. [illegible] शिकूं लागल्या कारणानें त्याचें [illegible] दुसऱ्या प्रकारचें [illegible] उत्पन्न होऊन त्यास मुख्य विषय समजत नाहीं [illegible] विषय पुष्कळ वेळ कष्टानें टिकण्याची योग्यता [illegible] असते. आणि वयाचा लहानपणा नसल्यामुळें, कोणापाशीं विचारून आपलें अज्ञान घालविण्यास अडचण नसते. वयानें मोठे झालेले कित्येक अभागी मनुष्य, ही एवढीशी गोष्ट यास समजत नाहीं असें लोक म्हणतील म्हणून आपलें अज्ञान झाकून हृदयरूप पडनाळ्यांत घालून कुजवीत ठेवितात.

4. Explain in English the following expressions, and frame short sentences in Marathi illustrating their use.— 15

(a) पांचांवर धारण बसणें.

(b) चोरावर मोर.

(c) [illegible] शहाणे.

(d) गौडबंगाल.

(e) तेल गेलें तूप गेलें हातीं धुपाटणें आलें.

5. Write a short essay in Maráthi on *one* of the following subjects :— 25

(a) Reverence.

(b) Cleanliness.

(c) Moral courage.

TUESDAY, 12TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

GUJARATI.

1 Explain in Gujaráti the following passages — 25

(a) આળસ ને સંતોષ, બહુ એ તો ઘર ઘાલે ;
ભણવા પર નહિ મન, ઉદ્યમો પાછા વાળે.
ભળે ગામમાં શેર, ઘણું ને સારું કહેવું ;
પરદેશે નવ શેર, તેહને ખોટું કહેવું.

કુટુમ્બમાં રહેવાય, સહાય સંબંધી કરતાં ;
મરણ સમો સચવાય, એમ અજ્ઞાની ડરતાં.
એમ ધરી સંતોષ, બાયલા બેસી રહેતા ;
કરે ન ઉદ્યમ લગાર, ભિખારી રોજે રહેતા.

(b) સૌ સૌના ઉદ્યમ વિશે, ફાવે સૌનો દાવ;
થળમાં ચાલે ગાડલી, જળમાં ચાલે નાવ.
જે કાળે જેને સૂઝ્યો, તેણે કરવું તેજ;
જગ નાટકમાં નાટકી, ઉત્તમ ગણાય એજ.

(c) દુષ્ટ ન દુષ્ટપણું તજે, કરીને તીર્થે સ્નાન;
ઝેર ઝબોળ્યું દૂધમાં, ઝેર જ રહે નિદાન.
સજ્જન સમ ગણી સેવતાં, દુર્જન સુજન ન થાય;
એરંડે રસ ના ચઢે, શેલડી સંગ સિંચાય.
શિખામણના શબ્દ તે, કહીયે નહિ ખળ સંગ;
પથ્થરે કાદવ હાંકતાં, ઉડે છાંટા અંગ.

(d) કરવું શું સરજ્યું અહીં, કરવી પુણ્યે ગમ;
સારૂં કરી કરવું અધિક, સારૂં સારૂં ઉત્તમ.
[illegible] બાંધે માળાને, પરમેશ્વરનો પાડ;
આળસના રૂપી સુતા, પ્યાલો મ્હોડે માંડ.
સારી વસ્તુ તણો, કર રૂડો ઉપભોગ;
પણ તો જડમડ થાવા વગર, માન તણો સંજોગ.

2. Explain [illegible] the substance of the following passage :— 2

કેવળ પાશ્ચાત્ય વિદ્યા આપણી કન્યાઓને વિષરૂપ અને તેનાં સંબંધીઓને વિડમ્બનાકારી થઈ પડે છે એવું આપણા લોક માને છે તે કાંઈ પાયા વિનાની, નિર્મૂળ, અથવા અસત્ય વાત જ છે એમ કાંઈ નથી. પરંતુ આ દોષ તે વિદ્યાનો નથી, પણ એના શિક્ષણના પ્રકારનો છે. ઉચિત વિધિથી આપેલું સોમલ અમૃતના ગુણ આપે છે અને અનુચિત વિધિથી આપેલું અમૃત વિષનું કામ સારે છે. કેવા વિધિથી પાશ્ચાત્ય વિદ્યા સ્ત્રીઓને આપીએ તો તેનું વિષ દૂર રાખી તેનું અમૃત મળે એ પ્રશ્નના ઉત્તર-વિસ્તારમાં પેસવાનો આ પ્રસંગ નથી, પણ એક બે વાક્યોથી સંક્ષિપ્ત ઉત્તર અપાય એટલો આપીશું. સંસ્કૃત વિદ્યા આ દેશનાં બાળકોને માતાના ધાવણ જેવી હોવાથી તરત પચે છે અને આમરણાન્ત સુધારૂપે રક્ષણ અને પોષણ કરે છે. વિજાતીય

[illegible] વિચારરૂપ આકાશમાં [illegible] કાગળરૂપ પતંગને મોકલીએ ને પૃથ્વી સાથે મોટા સૂત્રથી [illegible] તો તેની અવ્યવસ્થા થાય તેમાં કાંઈ નવાઈ નથી. [illegible] કલ્પનારૂપ પતંગોને આ આકાશમાં મોકલનારે [illegible] આવી ચતુરતા રાખવાની છે, એટલી ચતુરતાથી આ [illegible] થાય છે [illegible] નથી.

[illegible]:—

[illegible] દરવાજામાં બિહારીલાલ પેસતા જોઈ [illegible] કરવાને તેને રોકયો, અને એક [illegible] મારી તેને ફરી [illegible] એટલામાં તેનો [illegible] તરફ પાડયો. આગળ જતાં [illegible] તેને વિટલાઈ વળ્યા તેઓ સઘળાને [illegible] સોનાના [illegible] સંતોષ્યા. પછી કેટલાએક મહેતાઓને પણ પાનસોપારી [illegible]. [illegible] જ્યારે વખત થયું ત્યારે તેને બેસવાની જગ્યા મળી, અને એક સિપાઈને અંદરના ઓરડામાં ઠાકુર એક દીવાન સાથે વાત કરતો હતો ત્યાં જઈ [illegible]. ઠાકુરનું નાક પણ પૈસા સૂંઘી સૂંઘી [illegible] થયેલું હતું તેથી તેણે બિહારીલાલના પૈસાની ગંધ પારખી અને દીવાનને થોડીવાર [illegible] કરવાનું કહી ને બહાર આવ્યો. બિહારીલાલને આગળથી ભણાવી મૂક્યો હતો તે પ્રમાણે ઠાકુરને જોતાં જ તેણે પાઘડી માથા ઉપરથી ફેંકી દીધી, અને સાષ્ટાંગ થઈ પગે લાગીને રડી પડયો, પણ રડવાના શબ્દ [illegible] એવું ઠાકુરનું અંતઃકરણ કોમળ ન હતું. તેના હૈયા ઉપર તો જુદી રીતે જ અસર થતી હતી, અને જ્યારે સોનાનો ખણખણાટ તેને કાને પડતો ત્યારે જ તે ઇંદ્રિય દ્વારે તેના હૃદય પર અસર થતી.

4. Explain in Gujarati the meaning of the following passages:—

(*a*) ઘડી છોડી દેને, ગડમથલ તારા જગતની,
જરા જા આજે તો, નિર્જન મહા જંગલ મહીં;
તરુ પક્ષીમાંથી, જરૂર મળશે કાંઇ કીમિયા,
જશે અન્ધાપો આ, તુજ હૃદયનો ત્યાં વિહરતાં.

(*b*) દરિયો કરતો ઘૂ ઘૂ સાદ, ગાયે છે તે બ્રહ્મ અનાદ;
એજ જગતમાં સાચો વાદ, બાકી સહુ છે મિથ્યા વાદ
લાલ ચોળ અગ્નિને જોઈ, કેવો તું રહે છે મોહી;
જ્ઞાન જોત આપે આનંદ, પાપો બાળી કરતી ખંડ.

ಕಣ್ಣು ಬೇನೆ ಎಂದು ಹೇಳಿಕೊಳ್ಳಲಿಲ್ಲ; ಹೊಟ್ಟೆ ಬೇನೆ ಎಂದು ಹೇಳಿಕೊಂಡುದಕ್ಕೆ ಹೊಟ್ಟೆಗೆ ಔಷದವನ್ನು ಕೊಡದೆ ಕಣ್ಣುಗಳಿಗೆ ಔಷದವನ್ನು ಹಾಕುವುದಕ್ಕೆ ಬರುತ್ತೀರಿ. ಇದೇನಾಶ್ಚರ್ಯ ? ಎಂದು ಕೇಳಿದನು. ಅದಕ್ಕೆ ಆ ಪಂಡಿತನು— ನಿನಗೆ ಚೆನ್ನಾಗಿ ಕಣ್ಣು ಕಾಣಿಸುತ್ತಾ ಇದ್ದ ಪಕ್ಷದಲ್ಲಿ ನಿನ್ನೆಯ ರಾತ್ರಿಯಲ್ಲಿ ಸೀದರೊಟ್ಟಿಯನ್ನು ತಿನ್ನುತ್ತಾ ಇರಲಿಲ್ಲ. ಆದುದರಿಂದ ನಿನ್ನ ಕಣ್ಣುಗಳಿಗೆ ಪರೆ ಮುಚ್ಚಿಕೊಂಡಿದೆ. ಅದು ಪರಿಹಾರವಾಗುವಂತೆ ಚಿಕಿತ್ಸೆಯನ್ನು ಮಾಡಿದರೆ ಪದಾರ್ಥಗಳನ್ನು ಚೆನ್ನಾಗಿ ನೋಡಿ ತಿನ್ನುವಿ. ಆ ಮೇಲೆ ಹೊಟ್ಟೆ ಬೇನೆ ಬರಲಾರದು ಎಂದು ಹೇಳಿದನು. ಆಗ ಕೋಮಟಿಗನು ನಾಚಿಕೊಂಡು ಮನೆಗೆ ಹೋದನು.

6. Give idiomatic expressions in English for the following :— 5

(*a*) ನಡೆದು ಹೋದ ಮಾತಿಗೆ ನುಡಿದು ಫಲವೇನು.

(*b*) ಹಾಸಿಗೆ ಅರಿತುಕಾಲ್ನೀಡಬೇಕು.

(*c*) ಅತಿ ಸ್ನೇಹ ಗತಿ ಕೆಡಿಸಿತು.

(*d*) ಗಾಳಿ ಬಂದಾಗ ತೂರಿಕೊಳ್ಳಬೇಕು.

(*e*) ದೂರಕ್ಕೆ ಬೆಟ್ಟ ನುಣ್ಣಗೆ.

7. Write an Essay in Kánarese on *Indian Fruits.* 25

Or

Write a letter in Kánarese to your friend giving him "*A description of any festival*" that you may have seen.

TUESDAY, 12TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HINDUSTANI.

1. Translate into English :— 10

اس زبردست فاتح کی خدا ترسی اور سادہ
مزاجی مشہور زمانہ ہے - آپ اس وقت ایک
سرخ اونٹ پر سوار تھے - کجاوے سے کھجورون
کی تھیلی بندھی تھی - ایک گدڑی پہنے ہوے
تھے جس مین کہین کپڑے کے پیوند لگے تھے

اور کہین چمڑے کے - آپ کے پہنچتے ہی لشکر اسلام نے اس جوش و خروش کے ساتھہ نعرۂ اللہ اکبر بلند کیا کہ آس پاس کے تمام پہاڑ گونج اٹھے - حاکم یروشلیم نے جو محاصرون سے تنگ آگیا تھا اب یہی مناسب سمجھا کہ پھاٹک کھول دے اور امان کا طالب ہو — حضرت عمر نے کجاوے ہی پر سر رکھکر اس فتح کا سجدہ شکر ادا کیا - تمام اہل شہر کو امان بخشی - اور اس مقدس شہر پر قبضہ کرلیا

2. Paraphrase in Hindustání :— 12

کہین حفظ صحت کے آئین سکھائے
سفر کے کہین شوق ان کو دلائے
معاد ان کو سوداگری کے سمجھائے
اصول ان کو فرماندہی کے بتائے
نشان راہ و منزل کا اک اک بتایا
بنی نوع کا ان کو رہبر بنایا
سکھائی انہین نوع انسان پہ شفقت
کہا ”ہے یہ اسلامیون کی علامت
کہ ہمسائے سے رکھتے ہین وہ محبت
شب و روز پہنچاتے ہین سبکو راحت
وہ جو حق سے اپنے لئے چاہتے ہین
وہی ہر بشر کے لئے چاہتے ہین“

3. Express in English the exact sense of the following :— 24

(a) رانی یہ سنتے ہی آگ بگولا ہو گئی -
(b) چچا اور ماموں بھائی اور ہمشیر کی یادگار سے شمشیر کے ساتھہ پیش آئے -
(c) اگر میرے

دم میں دم ہے تو اس وزیر کی ترکی تمام کر دینا
کون بڑی بات ہے - (d) جو گرجتے ہیں وہ
برستے نہیں - (e) واہ! خوب حق نمک ادا
کیا - کیا سبز باغ دکھائے ہیں - اب آپ خان بہادر
کے خطاب کے لئے منہ دھو رکھیں - (f) جن
ہونہاروں کی طرف سے کھٹکا تھا پہلے انہی کا صفایا
کیا - (g) اب بیگم یہ چال چلی کہ خرم کی
طرف سے نواب صاحب کے کان بھرنے شروع کئے -
اور نواب تھے خدا کے فضل سے کانوں کے کچے
(h) زباندانی کے جوہر جو زباندان ہو وہ پہچانے

4. Explain in English, and use in Hindustani sentences — 15

(a) فرعون بے سامان (b) آنکھوں کے اندھے
اور گٹھڑی کے پورے (c) جان کے لالے پڑ جانا
(d) باغ باغ ہونا (e) منہ کی کھانا (f) منہ لگانا

5. Write in Hindustáni an essay of about two pages on any one of the following subjects.— 25

(1) کسی میلے کی کیفیت (2) ماں کی محبت
اور تعظیم (3) ہمت مرداں مدد خدا

TUESDAY, 12TH NOVEMBER.

[2-30 P.M. TO 5 30 P.M.]

SINDHI.

1. Explain (giving English equivalents wherever you can) the following :— 10

(١) ساڻو ٻه آڱر واڌو (٢) وهندي ڦاند
کي نه مارجي (٣) آهو ڪي ڪجي جو ميڻهن
وسندي ڪم اچي (٤) جيڪا ڏاريان ٻڪري
تنهن لنڊا ڪن (٥) دل ڪوڙي ته عذر گهڻا

2. Annotate:— 15

(۱) ڏر ڏونه ڏيڍا ر ڏم ڏم ڪرن ڏوس جو
وڪن نه رتيءَ جيترو اندر ۾ اهنڪار

(۲) مايا منجهه اُداس ورلو ڪوگر مکه رهي
ڪيو جنهن گر گيات سان انتر مکه ابياس
چڙهي ٿ ٿائين چيت ري انيٺي جو آڪاس
سامي چالي ناس ڏرشٽ مان سمسار کي

(۳) وچين چو وڪار هٽ نه ڳولئين هرت کي
لڪو ڪين لطيف چئي ٻارو چو ٻئي پار
ٿي سٺي ٻڌ سنڌ رو پرت پهون ۽ سين پار
ٿائي نيڻ نهار تو ۾ ڏيرو ڏوست جو

(۴) جي پائين جوڳي ٽيان ته سنگت سپيئي ٽوڙ
جي جايانه جاپندا جيُ تنهين سين جوڙ
ته تون پهچين ٽوڙ محبت جي ميدان ۾

(۵) پنهنجي تند تو آٿي ايندي
سنهي ٿلهي سپ لنگهي نه ويندي
جنس سيڪا جاري ٽيندي
هرڪا پنهنجو پورهيو مهليندي
ڪتي پناندر بار و بار
چرکو چوري ڪت ڪا تار

3. Write an essay (in Sindhi) on *one* of the following:—

(*a*) The Value of Education.

(*b*) The Company of the Good.

(*c*) Some Antiquities of Sind.

4. Translate into English :— 20

تنهنڪري وڏي درجي جا ماڻهو سکي ٿيڻ
جي اميد رکي نٿا سگهن- آءٌ خوشيءَ سان ويعاه
ڪندس تہ شاهي تختن ۾ محلاتن مان اهو سک
ٿجي وڃي غريبن جي جهڳين ۾ گوشہ نشينن جي
ڪنبن ۾ لکو آهي - جيڪو پنهنجو ڪم پنهنجي
طاقت سان ڪري ٿو سگهي ۾ جو پنهنجي اختياري
جو سچو گرد و پنهنجي اکين ڏسي ٿو سگهي ۾ جن
تي اعتبار اٿس تن سڀني کي پنهنجي جاڻپ سان
جو پسند ٿو ڪري ۾ دلاسي ۾ دڙڪي ڪان جو
ڌڪبجي نٿو سگهي اهڙي ماڻهوءَ جي خوشي ۾ ڪيرينگ
وجهندو يا انجي اميدن ۾ ڪير حرڪت آڻيندو ؟
يقين انکي ٻيو ڪي ڪين ڪرڻو آهي مگر اتيرو تہ
آوٻين کي پيار ڪري ۾ ٻيا ڪيس پيار ڪن ۾ نيڪ
ٿي هلي ۾ خوش رهي

5. Translate into Sindhi :— 20

You may have heard the story of young Isidore, the Spanish boy. So ard were the tasks at his school that he ran away in despair. As he sat y the wayside, miles away from the school which he hated, he noticed hat the stone on the edge of a well was worn into a groove. A woman ame to draw water, and thirsty Isidore asked for a drink which she ave him.

"What made that groove in the stone?" he inquired.

"The rope which holds the bucket" she replied. "Each time the ucket goes down for water or comes up full, the rope grinds against the one and wears a little dust away, and so, as years pass by, quite a deep arrow has been cut by the rope."

The Spanish lad reflected. A rope seems a soft thing compared with one, yet it wears the stone away by persisting. Why cannot a boy ersist as well as a rope? He went back and worked hard and in afte ears the Spanish people loved him as Saint Isidore.

TUESDAY, 12TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PORTUGUESE.

1. Paraphrase (in English) :— [illegible]

> Rainha do Mandovy, ó emporio gigantesco,
> que assombraste as nações com o teu esplendor,
> um manto d'amargura envolve a tua fronte.
> Já não resplende a luz no teu vasto horisonte
> senão para mostrar-te uns despojos de dor.
> Sumiu-se para sempre a tua gloria passada
> e a fama universal do teu nome temido.
> Hoje nas solidões dos teus vastos palmares
> echoa unicamente a voz deliciosa
> e a maga vibração doce e cariciosa
> dos sinos da tua Sé, orchestrando nos ares!

2. Translate into English :— 30

Em todos os paizes onde há ideas claras e sãs sobre a economia domestica, os trabalhos das industrias caseiras têem merecido a maior attencão ao Estado, ao municipio e á familia. Todos comprehendem e avaliam ahi os incalculaveis beneficios que resultam d'esses exercicios, que começam nos primeiros annos da infancia, como mera distracção e passatempo, e que são muitas vezes o ponto de partida para as carreiras mais brilhantes na vida futura. Esses exercicios, repetidos todos os dias em milhares de familias por dezenas de milhares de individuos, representam um trabalho lento, insensivel á primeira vista, mas que, continuado de geração em geração, cria essas aptidões mechanicas que tanto invejamos a certas nações extrangeiras, aptidoes que se transmittem de paes a filhos e a netos, e que, em ultima instancia, são a origem de industrias tradicionaes antiquissimas, e de inestimavel valor, por isso que se alimentam de um fundo que se renova constantemente. Dar uma applicação util ao tempo é, desde a infancia, um dos problemas mais importantes da educação. E que melhor uso poderá fazer o individuo do tempo que lhe sobeja dos negocios ou dos estudos, do que occupando-se em trabalhos que lhe desenvolvem as forças, robustecem a saude, e o distraem de vicios funestos?

3. Translate into Portuguese :— 25

(*a*) We should not be like those men who vainly imagine themselves wise because they have read much, when they have not applied wisely what they have read. They may be compared to an ignorant mob that during the late disturbances in France broke into an apothecary's shop and were so pleased with the colours of the drugs and tinctures that they freely ate and drank of them with terrible results.

(*b*) A young man once picked up a silver coin lying in the road. Ever afterwards, as he walked along, he kept his eyes steadfastly fixed on the ground in hopes of finding another. And, in the course of a long life, he did pick up at different times a good amount of gold and silver. But all these days he saw not that Heaven was bright above him and Nature beautiful around. He never once allowed his eyes to look up from the mud and filth in which he sought the treasure: and when he died, a rich old man, he knew this fair earth of ours only as a dirty road to pick up money in.

4. Describe *in Portuguese* (in about 40 lines) the advantages of your favourite form of recreation. 30

WEDNESDAY, 13TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ARITHMETIC AND ALGEBRA

N. B.—(i) The answers to the sections should be given on separate books.

(ii) All work should be neatly and carefully done. Important steps should be properly explained.

SECTION I.

1. (*a*) Define a Prime number. Resolve 151584 into prime factors and hence find its square root. 1

(*b*) Multiply 23·7543 by 5·35834 by contracted method only, correct to three places of decimals.

2. Find the cost in English money for a journey of 175 miles on a French railway if the rate charged is $\frac{1}{8}$ franc per kilometre, it being given that a franc = 9·75*d.* and a metre = 39·375 inches. 7

3. 32 men working 7 days of 9 hours each build [illegible] of a wall, how many more men must be put on to finish the wall in 8 days of 8 hours each, if 4 of the additional men do as much work as 5 of the first set? 9

4. Shew that 11

Banker's discount = True discount + interest on true discount.

The banker's discount on a certain bill is £490 and the true discount at the same rate is £410, what is the amount of the bill?

5. A man invests £1,500 partly in 3½ per cents at 7[illegible] and partly in 4 per cents at 105, his total annual income being £68½, find the amount of stock held by him of each kind. 10

SECTION II.

6. (*a*) How can you determine by inspection whether two straight lines, the equations of which are given, are parallel or not? 10

(*b*) Plot the points $A\ (5, 7)$, $B\ (7, 10)$, $C\ (2, 2)$ and $D\ (-1, -4)$, and find the equations of the straight lines AB and CD. Find the point of their intersection.

(Unit = ½ inch.)

7. Resolve into elementary factors:—

(i) $x^{12} + x^6 - 2$.

(ii) $x^8 - 16y^8$.

(iii) $a(a + 1)x^2 + x - a(a - 1)$.

(iv) $(a^2 - 9ab)^2 - 324b^4$.

8. (i) If $x + y = a$, and $xy = b$, express $x^4 + y^4$ in terms of a and b. 8

(ii) If $x + y + z = 6$, and $xy + yz + zx = 9$, show that,

$$\frac{1}{1 - x} + \frac{1}{1 - y} + \frac{1}{1 - z} = 0.$$

9. (i) Simplify — 3

$$\frac{\frac{a^3}{b^3} - \frac{b^3}{a^3}}{\left(\frac{a}{b} - \frac{b}{a}\right)\left(\frac{a}{b} + \frac{b}{a} - 1\right)} \times \frac{\frac{1}{b} - \frac{1}{a}}{\frac{1}{a^2} + \frac{1}{b^2} + \frac{1}{ab}}.$$

(ii) Extract the square root of —

$$\frac{(a^2 + b^2)^2}{a^4 + b^4 - 2a^2b^2} - 4 \cdot \frac{a}{a+b} \times \frac{b}{a-b}.$$

10. Solve the equations — 9

(i) $\frac{21}{x-12} - \frac{15}{x-5} = \frac{6}{x-7}$

(ii) $\left.\begin{aligned} \frac{10}{x} - \frac{19}{y} + 65 &= 0 \\ \frac{3}{5y} + \frac{4}{3x} &= 7 \end{aligned}\right\}$

(iii) $\frac{2x}{x-1} + \frac{3x-1}{x+2} - \frac{5x-11}{x-2} = 0.$

11. The difference in the speed of two trains is 15 miles per hour. The slower of the two takes two hours more time to travel a distance of 150 miles than the faster takes to travel 100 miles. Find their speeds in miles per hour. 10

WEDNESDAY, 13TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

GEOMETRY.

N.B.—(1) The answers to the two sections should be given in separate books.

(2) All work should be neatly and carefully done, figures should be drawn accurately. The use of intelligible abbreviations is recommended.

SECTION I.

1. (a) Construct a triangle ABC, having given $AB = 9$ cm., $AC = 5.8$ cm. and the perpendicular from A on BC equal to 5 cm. How many solutions are there? Measure the sides BC. 14

(b) Construct a triangle ABC having given $AB = 4$ cm., $AC = 6$ cm., and the median $AD = 3.5$ cm. Measure the side BC. Verify by calculation.

2. In a triangle the side opposite the greater angle is greater than the side opposite the less. 10

The side BA of a triangle ABC is produced to D. The angles CBD and CAD are bisected by straight lines meeting in E. BE cuts AC in F. Shew that EF is greater than AF.

3. If a straight line cuts two other straight lines and a pair of corresponding angles are equal, or a pair of interior angles on the same side of the cutting line are together equal to two right angles, the two straight lines are parallel. [illegible]

ABC is an isosceles triangle and *D* is a point in the base *BC*. Three straight lines *BE*, *DF* and *DG* are drawn, one from *B* and two from the point *D* making equal angles with *BC* and terminated by *AC* and *AB*. Prove that $DF + DG = BE$.

4. In any triangle the square on the side opposite to an acute angle is equal to the sum of the squares on the sides containing the acute angle *minus* twice the rectangle contained by one of the sides and the projection on it of the other. 14

In a trapezium the sum of the squares on the diagonals is greater than the sum of the squares on the oblique sides by twice the rectangle contained by the two parallel sides.

SECTION II.

5. State and prove geometrically the result corresponding to the identity—

$$(a + b + c)\, x = ax + bx + cx.$$

A, *B*, *C* and *D* are four points in a straight line taken in order; prove that

$$AB \cdot CD + AD \cdot BC = AC \cdot BD.$$

6. In a circle, equal chords are equidistant from the centre: and chords equidistant from the centre are equal. 14

If two chords are at unequal distances from the centre, the nearer chord is longer than the one more remote.

Draw the shortest chord through a given point within a circle.

7. If two chords of a circle intersect inside the circle, the rectangle contained by the two parts of the one is equal to the rectangle contained by the two parts of the other. 14

AB is the diameter of a circle, and any two chords *AC* and *BD* are drawn intersecting at *O* within the circle; shew that

$$AB^2 = AC \cdot AO + BD \cdot BO.$$

8. (*a*) Circumscribe about a circle a triangle having its angles 45°, 60° and 75°. 15

(*b*) The square on the side of an equilateral triangle inscribed in a circle is equal to three times the square on the side of a regular hexagon inscribed in it.

THURSDAY, 14TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

ELEMENTARY SCIENCE.

N.B.—The two sections to be given in separate books.

SECTION I.

1. Describe how you would show experimentally that water contains 8 parts by weight of oxygen to 1 part of hydrogen. 10

2. What impurities are generally associated with river and spring waters? 10

How can such waters be freed from these impurities?

3. What happens when— 10

(a) Iron and sulphur are heated together ;

(b) Tin-stone is heated with charcoal ;

(c) Caustic soda is added to nitric acid ;

(d) Sulphuric acid is poured on to common salt ;

(e) A small piece of sodium is heated in air ?

Give equations.

4. What weight of chalk and of sulphuric acid would be required to give 2,000 grammes of calcium sulphate ? 10

State what gas would be given off and how much of it could be obtained.

$(Ca = 40 ; C = 12 ; S = 32 ; O = 16 ; H = 1.)$

SECTION II.

5. How can the following be obtained :— 10

Copper nitrate, calcium chloride, red oxide of mercury, magnesium sulphate and lead nitrate ?

Give equations in each case.

6. Explain, with diagrams, how solar eclipses are caused, stating the conditions necessary for their occurrence. 11

Why is it that the moon appears equally eclipsed at all parts of the earth's surface from which it is visible, while the sun does not ?

7. How has the composition of the sun been ascertained ? 10

8. How is the longitude of a place on the surface of the earth determined ? 10

London is to the west of India, and yet the sun sometimes rises there earlier than in any part of India. Explain why it is so.

9. What grounds have you for believing that the axis of the earth is not at right angles to the plane of the ecliptic ? 11

Explain how it is possible to determine the inclination of the ecliptic to the plane of the equator from observations of the sun's altitude at different times of the year.

Or

Explain fully with diagrams :—

(a) Why the sun appears to change its position among the stars, and

(b) Why the altitude of the sun, when it crosses the meridian, is different at different times of the year ?

10. Answer any *one* of the following :— 8

(a) Explain clearly how you would determine by observation, whether a planet has its orbit within or without that of the earth.

(b) Suppose a certain planet is in quadrature to-day. State very approximately, where, when and how long you expect to see it as it moves in the heavens, from quadrature to opposition and again from opposition to its second quadrature, giving reasons for your answer.

(c) If you have made any observations of the planets, state very approximately, where, at what time and in what month, you observed any of the exterior planets and also how they changed position at different times of the year.

II.

PREVIOUS EXAMINATION.

EXAMINERS.

V. K. RAJAVADE, M.A.	In English.
The Rev. W. G. ROBERTSON, M.A., B.D.	
The Rev. ROBERT STRACHAN, M.A., B.D.	
JAMES SCOTT, M.A., F.I.E.S.	
N. S. PANSE, B.A.	In Sanskrit.
P. V. KANE, M.A., LL.B.	
The Rev. A. AILINGER, S.J.	In Latin.
N. S. TAKAKHAV, M.A.	
EZEKIEL MOSES EZEKIEL, B.A.	In Hebrew.
The Rev. A. REMBOLD, S.J.	
JEHANGIR E. DAVAR, O.I.P.	In French.
LOUIS PELTIER, B.A., B.Sc., O.I.P.	
B. T. ANKLESARIA, M.A.	In Avesta and Pahlavi.
D. M. MADAN, M.A., LL.B.	
MUHAMMAD ABBAS, M.A.	In Persian.
A. S. SHAH, ESQ.	
R. G. BHADKAMKAR, M.A.	In Pali.
D. KOSAMBI, ESQ.	
Rao Saheb B. J. NAIK, M.A.	In Mathematics.
The Rev. J. DEGEN, S.J.	
J. C. SWAMINARAYEN, M.A.	
B. D. AUDICH, M.A.	
O. V. MULLER, M.A.	In History.
N. G. WELINKAR, M.A., LL.B.	
N. S. TAKAKHAV, M.A.	
H. G. LIMAYE, M.A.	

MONDAY, 4TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

ENGLISH (*Text Books*).

N.B.—The answers to the two sections to be written in separate books.

SECTION I.

SCOTT'S *Marmion*.

1. Give the substance of the following passage fully *in your own words* :— 20

> But say, my Erskine, hast thou weigh'd
> That secret power by all obey'd,
> Which warps not less the passive mind,
> Its source conceal'd or undefined;
> Whether an impulse, that has birth
> Soon as the infant wakes on earth,
> One with our feelings and our powers,
> And rather part of us than ours;
> Or whether fitlier term'd the sway
> Of habit, form'd in early day?
> Howe'er derived, its force confest
> Rules with despotic sway the breast,
> And drags us on by viewless chain,
> Till taste and reason plead in vain.

2. Scan the following lines, breaking them into feet, and giving to each its metrical name :— 10

(*a*) The Bard you deign'd to praise, your deathless name has sung.

(*b*) The bride had consented, the gallant came late.

(*c*) And onward still the Scottish Lion bore
And still the scatter'd Southron fled before.

(*d*) Their front now deepening, now extending,
Their flank inclining, wheeling, bending,
Now drawing back, and now descending.

3. Write brief explanatory notes on *five* of the following :— 10

Flemish counterfeit: Archibald Bell-the-Cat; painted tabards; demivolte; Peter's keys; galliard; pied doublet; pentacle.

4. Explain with reference to the context :— 15

(*a*) 'Twas a brave race, before the name
Of hated Bothwell stain'd their fame.

(*b*) Thanks to St. Bothan, son of mine,
Save Gawain, ne'er could pen a line.

(*c*) Let the hawk stoop, his prey is flown.

(*d*) Fear, for their scourge, mean villains have,
Thou art the torturer of the brave.

5. What have you learned from the Introductions of the influences that helped to form Scott's literary tastes? 20

SECTION II.

MACAULAY'S *Lives*.

1. What effects did poverty and natural temperament have on the fortunes of Bunyan, Goldsmith, and Johnson? 20

2. Explain with reference to the context :— 12

(*a*) No man was ever written down but by himself.

(*b*) Sentimentality was all the mode.

(*c*) Addington was under a delusion much resembling that of Abou Hassan in the *Arabian Tales*.

(*d*) Like his own Christian in the cage, he found protectors even among the crowd of Vanity Fair.

3. Refer to and illustrate any *three* of the most prominent characteristics of Macaulay's style. 10

4. What is Macaulay's judgment on Pitt as a War Minister? Is this judgment just? 13

5 What is Macaulay's estimate of *The Pilgrim's Progress*, *Rasselas*, and *The Traveller*? 20

WEDNESDAY, 6TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ENGLISH (*Composition*).

Write an essay on *either* of the following subjects :— 50

(*a*) "Our happiness depends little on political institutions, and much on the temper and regulation of our minds."

(*b*) "Course of blood, our proverbs deem,
Is warmer than the mountain stream."
[Blood is thicker than water.]

PREVIOUS EXAMINATION, 1912.

MONDAY, 4TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANSKRIT.

(1) Kâlidâsa—Vikramorvas'îya.

(2) As'vaghosha—Buddhacharita, Cantos I—V.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Explain fully, giving context in brief :— 13

(*a*) ननु भणितमेव कमलनालायमानैरङ्गैः ।

(*b*) किं वा स्वर्गे स्मर्तव्यम् । न वा अश्यते न वा पीयते ।
केवलमनिमिषैर्नयनैर्मीना विडम्ब्यन्ते ।

(*c*) सर्वथा मदीयानां भागधेयानां विपर्यायेण प्रभावप्रकाशः ।

(*d*) संरम्भरूक्षमिव सुन्दरि यद्यदासीत्
त्वत्सङ्गमेन मम तत्तदिवानुनीतम् ।

(*e*) भवितव्यम् । दूरारूढः खलु प्रणयः असहनः ।

(*f*) अतिशायिनि समाधा वंश एवाशिषस्ते ।

2. Translate closely :—

(*a*) विद्युल्लेखाकनकरुचिरं श्रीवितानं ममाभ्रं
व्याधूयन्ते निचुलतरुभिर्मञ्जरीचामराणि ।
घर्मच्छेदात्पटुतरगिरो बन्दिनो नीलकण्ठा
धारासारोपनयनपरा नैगमाः सानुमन्तः ॥

(*b*) आश्वासितस्य मम नाम सुतोपलब्ध्या
सद्यस्त्वया सह कृशोदरि विप्रयोगः ।
व्यावर्तितातपरुजः प्रथमाभ्रवृष्ट्या
वृक्षस्य वैद्युत इवाग्निरुपस्थितोऽयम् ॥

Dissolve the compounds underlined.

3. (*a*) Derive the following words, giving rules where necessary :—

उपत्यका, पाथेयम्, शैलेयस्थली, उष्णालुः, सौभाग्यम् and प्रत्यर्थी.

(b) Give the meanings of the following words as used in the *Vikramorvas'iya* :—

विधुर, संनद्ध, पुरोभागिनी, आतङ्क and उदाहरण.

4. (a) What dramatic purpose is served by the character of the *Vidūshaka*? Adduce internal evidence in support of your answer.

(b) Quote from the *Vikramorvaśiya* ideas parallel to the following :—

(1) प्रकृतिरियं सत्त्ववतां न खलु वयस्तेजसो हेतुः ।

(2) We have strength enough to bear the misfortunes of another.

5 Translate into Sanskrit :—

It seemed as if the water must be rolling in like a solid wall, bent on breaking down the coast, and grinding it to powder. His heart ached heavily; tears rose to his eyes. "What a grain of dust I am in this world of storm!" he ejaculated; "Here I stand, — a strong man, utterly useless! Powerless to save the life I would die to serve! But may be the story is not true! The man can easily have been mistaken! Surely the king would not give up all for the sake of one woman's love."

SECTION II.

6. Translate into English :—

जीवितव्यमतिमात्रचञ्चलं यादृशं कमलिनीदले जलम् ।
तद्विधाय हृदयं सुनिश्चलं चिन्तयस्व हरिमेव केवलम् ॥
भक्तिरस्ति यदि देव तावकी तत्किमेति भवसम्भवं भयम् ।
अन्धकारगरिमा करोति किं भास्करे नयनमार्गमागते ॥

7. Translate into English :—

(a) पुष्पद्रुमाः स्वं कुसुमं पुफुल्लुः
समीरणोद्भ्रामितदिक्सुगन्धि ।
सुसम्भ्रमद्भृङ्गवधूपगीतं
भुजङ्गवृन्दापिहितात्तवातम् ॥
(v.l. पिहिताङ्गवालम्)

(b) नवरुक्मखलीनकिङ्किणीकं
प्रचलच्चामरचारुहेमभाण्डम् ।
अधिरुह्य स कण्ठकं सदश्वं
प्रययौ केतुमिव द्रुमाब्जकेतुः ॥
(v.l. केतुम्)

(c) Dissolve the compounds underlined, discuss the various readings and name the metres of (a) and (b).

Explain clearly :— 13

(1) एकं विनिन्ये स जुगोप सप्त सप्तैव तत्याज ररक्ष पञ्च ।

(2) दिदृक्षया शाक्यकुलध्वजस्य शक्रध्वजस्येव समुच्छ्रितस्य ।

(3) ततो बहिर्व्यादिशति स्म यात्रां रसान्तरं स्यादिति मन्यमानः ।

(4) सवितर्कविचारमाप शान्तं प्रथम ध्यानमनाश्रवप्रकारम् ।

(5) श्रुतवांश्च हि निर्वृतेति शब्द परिनिर्वाणविधौ मतिं चकार ।

(6) च्युतोऽथ कायात्तुषितात्त्रिलोकीमुद्द्योतयन्नुत्तमबोधिसत्त्वः ।

(a) Write grammatical and explanatory notes on — 10

लुम्बिनी, पुष्य, दुष्कृत, प्राथमकल्पिक, दुष्टु.

b) Parse the following :—

अचेच्छिदिष्ट, करुणायमानः, पिप्रीषुः, अजिहीर्षीत्, प्रतिम्वः.

c) What does the Buddhacharita tell you about the following —

असित, आत्रेय, the characteristics of a friend.

10. An eminent Sanskritist says: 'The style of Aśvaghosha is often ugh and obscure, but it is full of native strength and beauty.' Show by otations from your text how far this remark is justifiable. 5

Or

mmarise (in Sanskrit or in English) the reply given by Sarvârthasiddha to lâyi when the latter tried to induce the prince to enjoy the pleasures of e world.

MONDAY, 4TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LATIN.

LIVY—B. VI; OVID—Metamorphoses, B. 14.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Translate :— 23

(1) Mille lupi mixtique lupis ursique leaeque
occursu fecere metum. Sed nulla timenda
nullaque erat nostro factura in corpore vulnus.
Quin etiam blandas movere per aëra caudas
nostraque adulantes comitant vestigia, donec
excipiunt famulae.

(2) Talibus irritans Venerem Pleuronius Acmon
instimulat verbis veteremque resuscitat iram.
Acmona corripimus. Cui respondere volenti
vox pariter vocisque via est tenuata, comaeque
in plumas abeunt, plumis nova colla teguntur
pectoraque et tergum.

(3) Interdum madidas lacrimarum rore coronas
postibus intendit posuitque in limine duro
molle latus tristisque serae convicia fecit.
Saevior illa freto surgente cadentibus Haedis
spernit et inridet factisque inmitibus addit
verba superba ferox et spe quoque fraudat amantem.

N.B.—Scan the lines in (3). Interdum—amantem.

2. Explain the references or allusions and the meaning of the following passages :— 15

(1) (Aeneas:) "Numinis instar eris mihi semper, meque fatebor muneris esse tui. Pro quibus meritis aerias evectus ad auras tribuam tibi turis honorem"

(2) "Per, o, tua lumina quae mea ceperunt, consule nostris ignibus." Ille: "Quaecumque es," ait, "non sum tuus, ... nec venere externa socialia foedera laedam."

(3) Habet deos pars utraque, quodque deorum est instar, habent animos. Nec iam dotalia regna, nec te, Lavinia virgo, sed vicisse petunt.

(4) Nec iaculo gravis est, sed adunca dextera falce, qua modo luxuriem premit, fisso modo cortice lignum inserit et sucos alieno praestat alumno.

(5) Tatiusque patresque Sabini bella gerunt, arcisque via reclusa Tarpeia dignam animam poena congestis exuit armis.

3. Translate :— 1

Deinde Carthaginienses Regulum miserunt Romam, ut de pacis condicionibus et permutatione captivorum cum civibus suis ageret. Is tamen senatui suasit, ne pax cum Poenis fieret; 'illis enim fractis tot calamitatibus spem superesse nullam; suam vero vitam tanti non esse, ut tot milia captivorum propter se unum paucosque, qui capti essent ex Romanis, hostibus redderentur.' Quod consilium patres secuti Carthaginienses pacem petentes non admiserunt. Ipse Regulus, cum sui eum Romae retinere conarentur, negavit se in ea urbe mansurum, in qua, postquam Poenis servisset, dignitatem civis Romani habere non posset, et in Africam, ut promiserat, regressus est.

SECTION II.

4. Translate into English :— 2

(*a*) Centurionem, nobilem militaribus factis, iudicatum *pecuniae* cum duci vidisset, medio foro cum caterva sua accurrit et manum iniecit vociferatusque de superbia patrum ac crudelitate faeneratorum et miseriis plebis, virtutibus eius viri fortunaque, "tum vero ego" inquit, *nequiquam hac dextra Capitolium arcemque servaverim*, si civem commilitonemque meum tamquam Gallis victoribus captum in servitutem ac vincula duci videam."

What is the syntax of "pecuniae"? Explain the allusion in "nequiquam hac dextra ..... servaverim."

(*b*) "Quandoquidem," inquit Camillus, "Quirites, iam vos tribunicia libido, non potestas regit et intercessionem *secessione quondam plebis partam* vobis eadem vi facitis irritam, qua peperistis, non reipublicae magis universae quam vestra causa dictator intercessioni adero eversumque vestrum auxilium imperio tutabor. Itaque, si C. Licinius et L. Sextius intercessioni collegarum cedunt, nihil patricium magistratum inseram concilio plebis; si adversus intercessionem civitati leges imponere tendent, vim tribuniciam a se ipsa dissolvi non patiar."

Explain "secessione .... partam" and re-write in *oratio obliqua* the portion from "Itaque, si C. Licinius" .... etc., to "non patiar."

5. (*a*) Translate, with grammatical and explanatory notes on the itali- ed expressions:— 12

(1) Qui *nimius animi* cum alios principes sperneret, uni invideret, eximio simul honoribus atque virtutibus, *M. Furio*, aegre ferebat solum eum in *magistratibus*, solum apud exercitus esse.

(2) Simile veri est . . . . innumerabilem multitudinem liberorum capitum in eis fuisse locis, quae nunc vix *seminario* exiguo militum relicto *servitia* Romana ab solitudine vindicant.

In what connection is this theory advanced?

(3) Romani contra, ubicumque esset Latinus hostis, satis *scire* eum esse, quem *ad Regillum* lacum devictum centum annorum pace obnoxia tenuerint.

(*b*) Explain the terms:—Corona civica; reus sordidatus; patres nscripti.

6. Give a brief account of the proposals of the plebeian tribunes Licinius and L. Sextius. 6

7. Translate into Latin:— 10

Fabricius was one of the Roman envoys who had been sent to the camp Pyrrhus for the release of the prisoners. The king had heard of his right character and of his valour in war, and wished to win him over to s side. Finding bribes of little use, he tried to frighten him, while at a nference, by bringing up an elephant unexpectedly from behind the rtain (*aulaeum*). The beast set up a wild screeching, and held up its unk (*probosci, sidis*) over his head. But Fabricius stood quite unmoved.

MONDAY, 4TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

HEBREW.

(1) GENESIS, XXI—XXXV.
(2) PSALMS, XLII—C.

I. (*a*) Illustrate the uses of the particle מ׳. 7

(1) Comparative.
(2) Partitive.

(*b*) How do you construe ʿAL in the expression

אם על־בנים in Gen. 32,12?

II. (*a*) Quote the two Aramaic words occurring in the prescribed portion of Genesis and render them in Hebrew. 10

(*b*) What ancient mode of swearing do you find in Genesis? How do critics interpret it?

(*c*) Distinguish between מהר and מתן.

III. Comment on any three inscriptions occurring in the psalms rescribed. 7

IV. What intrinsic evidence do you find in the psalm in Question VII *b*, o support the traditional statement that Moses was the author of it? 8

V. Translate into Hebrew :— 25

Said Rabbi Jose, Once I was walking by the way and there met me a man who saluted me, and I returned his salute. He said to me, Rabbi, from what place art thou? And I said to him, from a great city of wise men and scribes am I. He said to me, Rabbi, should it be thy pleasure to dwell with us in our place, I would give thee a thousand thousand pieces of gold and goodly stones. I said to him, If thou wert to give me all the silver and gold and goodly stones in the world, I would not dwell except in the place of Torah. For thus it is written in the book of Psalms, by the hand of David, King of Israel, "The law of thy mouth is better to me than thousands of gold and silver." Moreover in the hour of a man's decease not silver nor gold nor goodly stones accompany the man but Torah and good works alone, for it is said, "When thou goest, it shall lead thee; when thou sleepest, it shall keep thee; and when thou awakest, it shall talk with thee." And it saith "The silver is mine, and the gold is mine," saith the Lord of hosts.

VI. Translate and comment where necessary :— 18

(1) וַיַּרְא וְהִנֵּה־אַיִל אַחַר נֶאֱחַז בַּסְּבַךְ בְּקַרְנָיו׃

(2) אָנֹכִי בַּדֶּרֶךְ נָחַנִי ה״ בֵּית אֲחֵי אֲדֹנִי׃

(3) יֶשׁ־לְאֵל יָדִי׃

(1) וַאֲנִי אֶתְנַהֲלָה לְאִטִּי לְרֶגֶל הַמְּלָאכָה אֲשֶׁר
לְפָנַי׃

(5) שני גוים בבטנך ושני לאמים ממעיך יפרדו
ולאם מלאם יאמץ ורב יעבד צעיר׃

Point the last (5) and examine it in the light of Hebrew Poetry.

VII. Translate into English :— 5

(a) וַיְהִי רָעָב בָּאָרֶץ מִלְּבַד הָרָעָב הָרִאשׁוֹן אֲשֶׁר
הָיָה בִּימֵי אַבְרָהָם וַיֵּלֶךְ יִצְחָק אֶל־אֲבִימֶלֶךְ מֶלֶךְ־פְּלִשְׁתִּים
גְּרָרָה׃ וַיֵּרָא אֵלָיו יְיָ וַיֹּאמֶר אַל־תֵּרֵד מִצְרָיְמָה
שְׁכֹן בָּאָרֶץ אֲשֶׁר אֹמַר אֵלֶיךָ׃ גּוּר בָּאָרֶץ הַזֹּאת
וְאֶהְיֶה עִמְּךָ וַאֲבָרְכֶךָּ כִּי־לְךָ וּלְזַרְעֲךָ אֶתֵּן אֶת־כָּל־הָאֲרָצֹת
הָאֵל וַהֲקִמֹתִי אֶת־הַשְּׁבֻעָה אֲשֶׁר נִשְׁבַּעְתִּי לְאַבְרָהָם
אָבִיךָ׃ וְהִרְבֵּיתִי אֶת־זַרְעֲךָ כְּכוֹכְבֵי הַשָּׁמַיִם וְנָתַתִּי

לְזַרְעֲךָ אֵת כָּל־הָאֲרָצֹת הָאֵל וְהִתְבָּרֲכוּ בְזַרְעֲךָ כֹּל
גּוֹיֵי הָאָרֶץ׃ עֵקֶב אֲשֶׁר־שָׁמַע אַבְרָהָם בְּקֹלִי וַיִּשְׁמֹר
מִשְׁמַרְתִּי מִצְוֹתַי חֻקּוֹתַי וְתוֹרֹתָי׃

(b) יֹשֵׁב בְּסֵתֶר עֶלְיוֹן בְּצֵל שַׁדַּי יִתְלוֹנָן׃ אֹמַר
לַייָ מַחְסִי וּמְצוּדָתִי אֱלֹהַי אֶבְטַח־בּוֹ׃ כִּי הוּא
יַצִּילְךָ מִפַּח יָקוּשׁ מִדֶּבֶר הַוּוֹת׃ בְּאֶבְרָתוֹ ׀ יָסֶךְ לָךְ
וְתַחַת־כְּנָפָיו תֶּחְסֶה צִנָּה וְסֹחֵרָה אֲמִתּוֹ׃ לֹא תִירָא
מִפַּחַד לָיְלָה מֵחֵץ יָעוּף יוֹמָם׃ מִדֶּבֶר בָּאֹפֶל יַהֲלֹךְ
מִקֶּטֶב יָשׁוּד צָהֳרָיִם׃ יִפֹּל מִצִּדְּךָ ׀ אֶלֶף וּרְבָבָה
מִימִינֶךָ אֵלֶיךָ לֹא יִגָּשׁ׃ רַק בְּעֵינֶיךָ תַבִּיט וְשִׁלֻּמַת
רְשָׁעִים תִּרְאֶה׃ כִּי־אַתָּה יְיָ מַחְסִי עֶלְיוֹן שַׂמְתָּ
מְעוֹנֶךָ׃ לֹא תְאֻנֶּה אֵלֶיךָ רָעָה וְנֶגַע לֹא־יִקְרַב בְּאָהֳלֶךָ׃
כִּי מַלְאָכָיו יְצַוֶּה־לָּךְ לִשְׁמָרְךָ בְּכָל־דְּרָכֶיךָ׃ עַל־כַּפַּיִם
יִשָּׂאוּנְךָ פֶּן־תִּגֹּף בָּאֶבֶן רַגְלֶךָ׃ עַל־שַׁחַל וָפֶתֶן תִּדְרֹךְ
תִּרְמֹס כְּפִיר וְתַנִּין׃ כִּי בִי חָשַׁק וַאֲפַלְּטֵהוּ אֲשַׂגְּבֵהוּ
כִּי־יָדַע שְׁמִי׃ יִקְרָאֵנִי ׀ וְאֶעֱנֵהוּ עִמּוֹ אָנֹכִי בְצָרָה
אֲחַלְּצֵהוּ וַאֲכַבְּדֵהוּ׃ אֹרֶךְ יָמִים אַשְׂבִּיעֵהוּ וְאַרְאֵהוּ
בִּישׁוּעָתִי׃

MONDAY, 4TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

FRENCH.

N.B.—The answers to the two sections to be given in separate books.

SECTION I.

ÉMILE RICHEBOURG.—Le Million du Père Raclot.

1. Translate into English :— 14

(*a*) A Aubecourt et aux alentours, les méchantes langues s'en donnèrent à cœur joie. Comme l'avait deviné Marthe, on n'hésita pas à dire que le mariage avait été rompu parce que le général de Santenay et son fils avaient appris enfin ce que c'était que Mathurin Raclot.

Et comme il y a des gens qui suppléent à ce qu'ils ne savent point par des inventions, on racontait que, lorsqu'il avait eu connaissance de toutes les gredineries de l'usurier, le vieux général s'était mis dans une colère épouvantable, dont un furieux accès de goutte avait été la conséquence.

Après tous les racontars on disait, pour conclure :

—Tout de même, M. Georges de Santenay ne pouvait pas épouser la fille de ce vieux grigou de Raclot.

On en disait bien d'autres.

La vieille nourrice entendait les bavardages de ceux-ci, les commérages de celles-là, les méchancetes de tous. Indignée, furieuse, elle enrageait de ne pouvoir sauter à la gorge de tous ces imbéciles qui vomissaient les plus grossières injures contre la jeune fille.

(*b*) Depuis le jour des obsèques de M. Raclot, Mlle Marthe n'a pas remis les pieds au château, elle a demandé asile à une pauvre vieille femme du pays, la mère Lauzier, qui a été sa nourrice. Elle a là une toute petite chambre, que je pourrais comparer à une cellule de prison, mal éclairée, humide, aux murs [illegible] à la chaux, n'ayant pour tout mobilier qu'un vieux bahut de chêne vermoulu, deux chaises en piteux état et une couchette en bois blanc avec une paillasse et un matelas.

2. Answer *one* of the following questions :— 10

(*a*) Describe fully the part which Miss Lorreau plays in the story of "Le Million du Père Raclot".

(*b*) "Toujours la vanité and l'orgueil." * * * "C'est donc un avare ?"

Show by reference to the text how far these remarks can justly be applied to Mathurin Raclot.

3. Translate and explain with reference to the context :— 9

(*a*) Ne vous mettez pas martel en tête, cher Monsieur Raclot, mon fils vous laissera parfaitement tranquille.

(*b*) "Ces bijoux, monsieur," me dit-elle, "appartiennent aussi aux victimes, vous les comprendrez dans votre inventaire."

(*c*) La terre sur laquelle la bonne demoiselle pose ses pieds devrait être jonchée de fleurs.

(*d*) La terre, toujours la terre, toujours la fureur d'augmenter son bien !

4. Distinguish between *belle-fille* and *belle fille*; *parti* and *partie*; *échapper à* and *s'échapper de*; *à la longue* and *au long*; *partant* and *pourtant*.

Mention a few instances in which the apostrophe is used after the adjective *grand*, as *grand'chose*.

5. Translate into French :— 1

(*a*) A Santenay does not marry a young girl because she has money.

(*b*) I ought not to conceal from you that my nephew wanted to obey you, and that his father and myself exhorted him no longer to think of you.

(*c*) I am all attention.

(*d*) It will make your hair stand on end.

(*e*) You are as close as a fist.

(*f*) To renounce riches, Marthe, and to take a vow of poverty, is sublime.

(*g*) The notary had accomplished his mission; he saluted the father and the daughter and retired, without the young woman thinking of accompanying him to the door.

SECTION II.

AUGIER :—Le Gendre de M. Poirier.

6. Translate —

(*a*) Into English :—

(1) Orphelin à quinze ans, maître de ma fortune à vingt, j'avais promptement exterminé mon patrimoine et m'étais mis en devoir d'amasser un capital de dettes digne du neveu de mon oncle. Or, au moment où, grâce à mon activité, ce capital atteignait le chiffre de cinq cent mille francs, mon septuagénaire d'oncle n'épousait-il pas tout à coup une jeune personne romanesque dont il se croyait adoré?

(2) Il ya des confidences qui veulent être encouragées; l'âme a sa pudeur.

(3) Etes-vous toujours furieux contre votre panier percé de gendre? Avez-vous pris votre parti?—Non, monsieur; mais j'ai pris un parti.

(4) Qu'on le croie ou non, c'est le cadet de mes soucis. Je n'ai aucune prétention à la gentilhommerie, Dieu merci! je n'en fais pas assez de cas pour cela.

(*b*) Into French :— 1

(1) With the experience you have acquired in business, you may aspire to anything. Trade is the true school for statesmen.

(2) He has known me only for one hour!

(3) When I consulted you, why did you not put yourself across my way? Why did you not tell me what was to happen?

(4) He knows that every bond is broken between us, and that he can no longer be but a stranger to me.

7. In what is *Antoinette* superior to her husband and to her father? 10

8. Translate and explain the following *without* reference to the context :— 10

(1) Une pierre dans mon jardin!

(2) Vous lui en faites voir de cruelles.

(3) Il me coûte les yeux de la tête.

(4) Je vous sers de plastron.

(5) Je regrette un moment de vivacité.

9. Translate into French:— 12.

Nearly thirty years have now elapsed since the master, beloved of all, was laid in his grave. (This was written long ago about Chopin, the great musician and composer, who died in 1849.)* In proportion to the increase in the number of his admirers, the circle of those whom he knew, of those who shared his thoughts, diminishes every day. No lively remembrance of him remains, except with his best pupils. The time has come in which to collect these precious remembrances, to snatch them from oblivion, to transmit them to posterity as the echo of the manner of the master.

MONDAY, 4TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

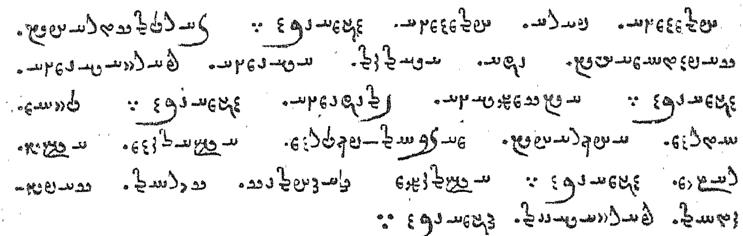
AVESTA AND PAHLAVI.

SECTION I.

AVESTA—Yasna Hâs I—VIII.

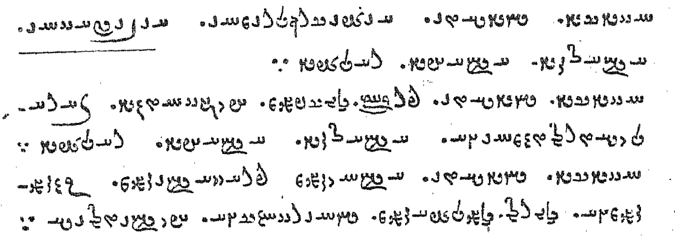
N. B.—The two sections should be answered in separate books.

1. Rewrite the following, correcting all the errors in the spelling:—

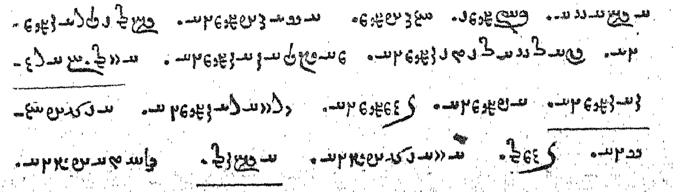


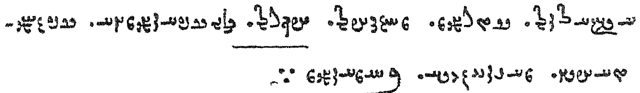
2. Translate into English and annotate the words underlined:—

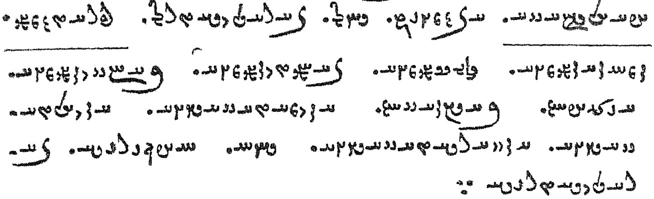
(a)



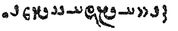
(b)

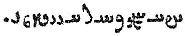


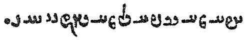


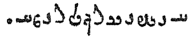
(c) 

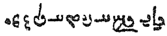
3. Annotate and explain fully the following words, tracing them to their roots:— 12

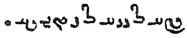
(a) 

(b) 

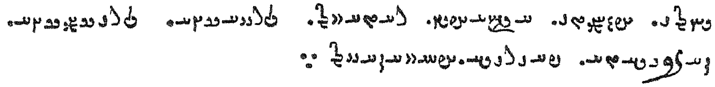
(c) 

(d) 

(e) 

(f) 

4. What, in your opinion, is meant to be expressed by the sentence:— 5



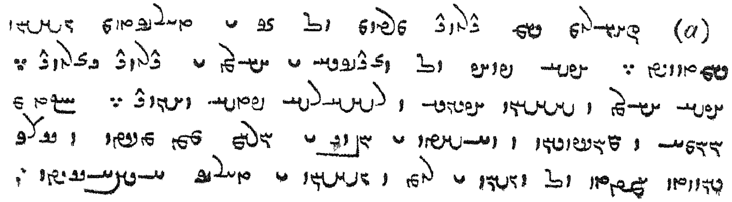
5 Translate into Avesta:— 10

O Ahura Mazda, we men are Thy creatures. Thine is the good mind, and Thine the righteousness by means of which we sacrifice unto Thee with Thine own bountiful devotion. The desirable sovereignty is Thine. Grant us, O Ahura Mazda, this boon that we may obtain perfection in this world which is material, and immortality in the world beyond.

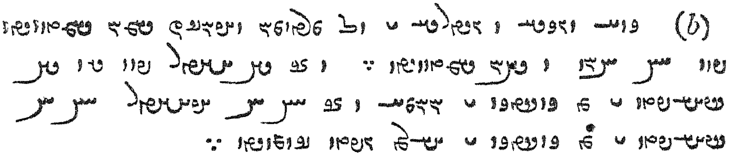
SECTION II.

PAHLAVI—Mainu-i-Kharad, Chapters VI—XX

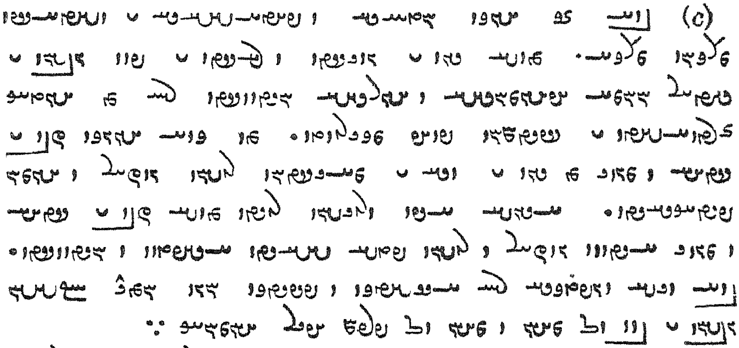
6 Translate into English:— 22

(a) 

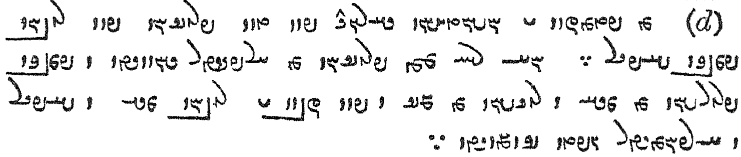
(b)



(c)



(d)



(e) Transliterate (c) into English with punctuations.

7. Translate into Pahlavi:— 9

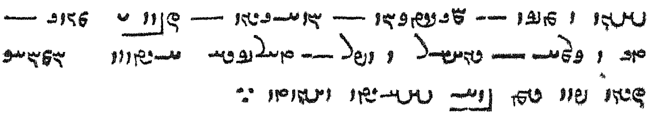
The wicked Aharman made a treaty of nine thousand winters with Aûhrmazd. Until the completion of the period, neither of them is to alter it or act otherwise. And when the nine thousand years are completed, Aharman will be unfit for action; the holy Sarôs will smite Aêsam; Mitr, Infinite Time, the spirit of Justice who is deceived by none, Destiny and Divine Providence will destroy the creatures and creation of Aharman.

8 (a) How do you account for the title *Mainu-i-Kharad* given to your Pahlavi text? 9

(b) State concisely the injunction against 'travel' given in your text.

How would you interpret the injunction?

9. Annotate:— 1(



PREVIOUS EXAMINATION, 1912.

MONDAY, 4TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PERSIAN.

(1) UNSURUL-MAÂLI—Kabus Nâma, chapters 1 to 22, omitting chapters 15 and 16.

(2) HÂFIZ—Odes 1 to 75.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Translate :—

(a) بیا که قصر امل سخت سست بنیادست
بیار باده که بنیاد عمر بر بادست
غلام همت آنم که زیر چرخ کبود
ز هر چه رنگ تعلق پذیرد آزادست
نصیحتی کنمت یاد گیر و در عمل آر
که این حدیث ز پیر طریقتم یادست
مجو درستی عهد از جهان سست نهاد
که این عجوزه عروس هزار دامادست
چه گویمت که بمیخانه دوش مست و خراب
سروش عالم غیبم چه مژدها دادست
که ای بلند نظر شاهباز سدره نشین
نشیمن تو نه این کنج محنت آبادست
ترا ز کنگرهٔ عرش می زنند صفیر
ندانمت که درین دامگه چه افتادست
غم جهان مخور و پند من مبر از یاد
که این لطیفهٔ نغزم ز رهروی یادست
رضا بداده بده وز جبین گره بگشای
که بر من و تو در اختیار نگشادست

(b) حکایت کنند که روزی افلاطون نشسته بود۔ از جملهٔ خواص مردی بسلام او آمد و از هر نوع سخن می گفت۔ درمیانهٔ سخن گفت ای حکیم

امروز فلان مرد را دیدم که حدیث تو میکرد
و ترا بسیار دعا و ثنا می گفت و همی گفت که
افلاطون عجب بزرگوار مردیست - خواستم که
شکر او را بتو رسانم - افلاطون را ازین سخن
عجب آمد - سرفرو برده بگریست و سخت دلتنگ
شد - آنمرد گفت ای حکیم از من چه رنج آمد
ترا که چنین دلتنگ شدی - افلاطون گفت ای
خواجه مرا از تو هیچ رنجی نرسید ولیکن دردی
بدتر ازین چه بود که مرا جاهلی بستاید و کار من
او را پسندیده آید - ندانم کدام کار جاهلانه
کرده ام که بطبع او نزدیک بود که اورا خوش
آمده مرا بستود تا توبه کنم ازان کار و این غم
برمن است که مگر من هنوز جاهلم که ستودۀ
جاهلان باشم

2. Write short notes on :— 15

آئینۀ سکندر - چار تکبیر - سعی و مروه - قانون
و شفا - پردۀ عنبی - ده دراکه - کعبتین - دودانگ

3. What internal evidence is there of the existence of Sufustic notions in the Ghazals of Ḥafiz? Show that his poetry floats between mysticism and materialism. 7

4. Give a brief analysis of the observations of Kaykāūs on (*a*) prayer and fasting, (*b*) wine-drinking, and (*c*) accumulation of wealth. 8

SECTION II.

5. Translate and explain :— 20

(*a*) کشد نقش اناالحق بر زمین خون
چو منصور ار کشی بر دارم امشب

(*b*) تا چه بازی رخ نماید بیدقی خواهیم راند
عرصۀ شطرنج رندان را مجال شاه نیست

(c) عاشق که شد که یار بحالش نظر نکرد
ای خواجه درد نیست وگرنه طبیب هست

(d) چنان کن که خصم برتو شام خورد تو
چاشت خورده باشی براو

6 Write a short biographical account of Kaykāūs mentioning the details of his life and lineage referred to by himself in the Qabus-nama. 10

7. Translate into Persian :— 20

"Kaykāūs considers love at first sight to be absurd and impossible. He discusses the qualities which go to the making of a good wife, and emphasises the importance of allying oneself by marriage with powerful and influential families. Girls, in his opinion, should not be taught to read and write, but should not be sold to rich and undesirable suitors. Children should be beaten if they are idle or naughty and liberally rewarded with pocket-money if they are industrious and well-behaved; and on no account should boys omit to learn the art of swimming."

MONDAY, 4TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PALI.

Saṁyutta-Nikāya—Selections.

The Jātakas—Selections.

N.B.—The two sections are to be answered in separate books.

SECTION I.

1. Translate into English :— 15

(*a*) अथेको बाळिसिको सत्त रोहितमच्छे उद्धरित्वा वल्लिया आवुणित्वा नेत्वा गङ्गातीरे वालिकाय पटिच्छादेत्वा मच्छे गण्हन्तो अधोगङ्गं भस्सि. उद्दो मच्छगन्धं घायित्वा वालिकं वियूहित्वा मच्छे दिस्वा नीहरित्वा अत्थि नु खो इमेसं सामिकोऽति तिक्खत्तुं घोसेत्वा सामिकं अपस्सन्तो वल्लियं डसित्वा अत्तनो वसनगुम्बे ठपेत्वा वेलायमेव खादिस्सामीऽति अत्तनो सीलं आवज्जन्तो निपज्जि. सिगालोऽपि निक्खमित्वा गोचरं परियेसन्तो एकस्स खेत्तगोपकस्स कुटियं द्वे मंससूलानि एकं गोधं एकञ्च दधिवारकं दिस्वा अत्थि नु खो एतस्स सामिकोऽति तिक्खत्तुं घोसेत्वा सामिकं अदिस्वा दधिवारकस्स उग्गहणरज्जकं गीवाय पवेसेत्वा मंससूले च गोधञ्च मुखेन डसित्वा नेत्वा अत्तनो सयनगुम्बे ठपेत्वा वेलायमेव खादिस्सामीऽति अत्तनो सीलं आवज्जन्तो निपज्जि.

(b) दुस्स मे खेत्तपालस्स रत्तिभत्तं अपाभतं ।
मससूला च द्वे गोधा एकञ्च दधिवारकं ।
इदं ब्राह्मण मे अत्थि, एतं भुत्वा वने वसाऽति ॥

N.B.—Name and dissolve the compounds underlined.

2. Summarise *in Pali* the जवसकुणजातक. 10

3. (*a*) Frame sentences of your own illustrating the use of :— 14

यञ्चे, वत, कतम and यथा.

(*b*) Write appropriate notes upon —

अम्मणमत्तेन, आमकसुसानं, भरुकच्छ, पञ्चन्नं महानदीनं, and उपोसथङ्गानि.

4 Translate into English :— 12

(*a*) अहं बुद्धं च धम्म च संघं च सरणं गतो
उपासकत्तं वेदेसिं सक्कपुत्तस्स सासने ।
इमेसु तीसु वत्थूसु उत्तमेसु नरुत्तम
चित्तं पसादयित्वान सद्धाय सरणं वज ॥

(*b*) तेविज्जा इद्धिपत्ता च चेतोपरियायकोविदा ।
खीणासवा अरहन्तो बहू बुद्धस्स सावका ॥

SECTION II.

5. Translate into English :— 15

अक्कोधस्स कुतो कोधो दन्तस्स समजीविनो ।
सम्मदञ्ञाविमुत्तस्स उपसन्तस्स तादिनो ॥
तस्सेव तेन पापियो यो कुद्धं पटिकुज्झति ।
कुद्धमप्पटिकुज्झन्तो सङ्गामं जेति दुज्जयं ॥
उभिन्नमत्थं चरति अत्तनो च परस्स च ।
परं संकुपितं ञत्वा यो सतो उपसम्मति ॥
उभिन्नं तिकिच्छन्तमत्तनो च परस्स च ।
जना मञ्ञन्ति बालो ति ये धम्मस्स अकोविदा ति ॥

6. Explain with reference to the context :— 1

(*a*) गाथाभिगीतं मे अभोजनेय्यं ।

(*b*) अन्तोजटा बहिजटा जटाय जटिता पजा ।

(*c*) आकिण्णलुद्दो पुरिसो धातिचेलंऽव मक्खितो ।

(*d*) एकस्स पदवीतिहारस्स कलं नाग्घन्ति सोळसिं ।

7. Write short notes upon :—

सावत्थि, तेविज्जो, खारिभारो, योगक्खेमाधिगाहनं, and संघाटिपारुतो.

8 Translate into Pali :—

It happened by chance that for two or three days the supply of water ceased which wayfarers used to draw, and the creatures could get nothing to drink. A monkey, tormented with thirst, walked up and down by the well looking for water.

Now the Bodhisatta came that way on some errand, drew water for himself, drank it, and washed his hands; then he noticed the monkey. Seeing how thirsty he was, he drew water from the well and filled the trough for him. Then he sat down under the tree, to see what the creature would do

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TUESDAY, 5TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ALGEBRA.

1 State the three fundamental laws for positive indices.

Simplify—

$$\frac{(x^n + y^n)(x^{2n} - y^{2n})(x^{-n} - y^{-n})(x^{-2n} + y^{-2n})}{(x^n - y^n)(x^{2n} + y^{2n})(x^{-n} + y^{-n})(x^{-2n} - y^{-2n})}$$

Reduce $\sqrt{\frac{2\sqrt{2} + \sqrt{3} + 1}{2\sqrt{2} - \sqrt{3} - 1}}$ to a form in which the denominator is rational.

2. If $\frac{a}{b}$ and $\frac{c}{d}$ be two unequal fractions, a, b, c, d being positive integers, shew that the fraction $\frac{a + c}{b + d}$ has a value lying between the two. 13

If $\frac{a}{b} > 1$ and $\frac{c}{d} < 1$, arrange in order of magnitude the fractions

$$\frac{a}{b}, \frac{c}{d}, \frac{a^2}{b^2}, \frac{c^2}{d^2}, \frac{ac}{bd}, \frac{a(1+c)}{b(1+d)}, \frac{c(1+a)}{d(1+b)}.$$

3. Write down the roots of the equation $x^2 - px + q = 0$ and find the sum of the roots and also their product.

If α, β be the roots of the equation $x^2 - 3x - 6 = 0$,
find the value of $(1 - \alpha^3)(1 - \beta^3)$.

Solve

$$x^2 - y = y^2 - x = \frac{21}{16}.$$

4. Trace the graph of the expression $4 - 3x - x^2$ between $x = -5$ and $x = 2$; what is its maximum value? Also find the points in which the graph is intersected by the straight line $4x + y = 2$.

(Unit = $\frac{1}{2}$ inch.)

5. If A, G, H be the arithmetic, geometric and harmonic means between two positive quantities, prove that $AH = G^2$ and $A > G > H$. 11

$\frac{a}{b}, \frac{c}{d}, \frac{e}{f}$ are three fractions in G.P. such that a, c, e are in A.P. and b, d, f also in A.P.; shew that $\frac{e - a}{f - b} = \pm \frac{c}{d}$.

6. Find the number of permutations of n dissimilar things taken r at a time, and express the answer in a factorial form. 9

Find the integer expressing the number of ways in which a party of 4 ladies and 6 gentlemen can seat themselves in a railway carriage with 5 seats on each side, so that the ladies may have the corner seats.

7. Prove that the sum of the coefficients of the terms in the expansion of $(1 + x)^n$ where n is a positive integer is 2^n and find the sum of the coefficients of all the odd terms. 12

Find the value of the term independent of x in the expansion of $\left(3x - \frac{1}{3x}\right)^{2n}$, and the values of the middle terms of $\left(3x - \frac{1}{3x}\right)^{2n+1}$, n being a positive integer.

8. Find the amount of an annuity of £A per annum that has been left unpaid for 'n' years at compound interest. 12

A man invests Rs 2,817 at 4 % per annum at compound interest adding Rs. 420 at the end of each year. What will be his capital at the end of 8 years?

$$\log 104 = 2·0170,\ \log 2817 = 3·4498,\ \log 38·53 = 1·5858,$$
$$\log 1·368 = ·1360.$$

9. If $f(x)$ is a rational integral function of x like $ax^5 + bx^4 + cx^3 + dx^2 + ex + f$, prove that $f(h)$ will be the remainder when $f(x)$ is divided by $x - h$. 8

Find the factors of—

$$(b^3 + c^3)(b - c) + (c^3 + a^3)(c - a) + (a^3 + b^3)(a - b).$$

TUESDAY, 5TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

GEOMETRY.

1. If two triangles have one angle of the one equal to one angle of the other and the sides about these equal angles proportional, the triangles are similar. 13

PQ and PR are tangents from P to a circle. The line joining P to the centre O of the circle cuts QR in X and PYZ is any other secant through P meeting the circle in Y and Z. Prove that

$$PY : PX :: PO : PZ$$
$$\text{and } PY : PO :: YX : ZO.$$

2. In the given triangle ABC, $AB = 7$ cm., $BC = 6$ cm., $AC = 4·5$ cm., inscribe an isosceles right-angled triangle so that one of the equal sides be parallel to BC and the vertex lie in AC. Add the proof. 8

3. If the lines AD, BE, CF drawn from the vertices A, B, C of a triangle ABC, meeting the opposite sides in D, E, F are concurrent, shew that $BD.CE.AF = DC.EA.FB$. 11

The sides BC, CA, AB of the triangle ABC are divided internally at the points D, E, F, so that $BD : DC = CE : EA = AF : FB$; BE cuts CF in O and AO meets BC in G. Prove that $BG : GC = CD^2 : BD^2$.

4. If from any point on the circumference of a circle, perpendiculars be drawn to the sides of an inscribed triangle, the three feet of the perpendiculars are collinear. 10

If the Simson line of a point on the circum-circle of the triangle ABC be equally inclined to two sides, prove that the point bisects the arc intercepted by the third side.

5. The locus of a point whose distances from two fixed points have a constant ratio is a circle. 12

Construct a triangle ABC, having given the base $BC = 6$ cm., $AB : AC :: 2 : 1$, and the perpendicular from B on $AC = 5$ cm. How many solutions are there?

6. Determine the locus of points from which tangents drawn to two given circles are equal. 12

Tangents OA, OB to a circle are bisected at P and Q respectively, and R is any point in PQ; prove that RO is equal to the tangent from R to the circle.

7. In a circle of radius 4 centimetres a regular pentagon is inscribed; find its area by reducing it to an equivalent square. 12

8. If a straight line be drawn through a given point to cut a given circle, the intersection of the tangents at the two points of section always lies on a fixed straight line. 12

Two circles of radii 2 and 1 in. respectively intersect in the point P, the distance between their centres A and B is equal to 2·4 in., the line PO bisects the angle APB meeting AB in O. The polars of O with respect to the two circles A and B meet the line AB in M and N respectively. Prove that $AM = 2BN$.

9. OA and OB are two radii at right angles to one another in a circle (centre O and radius equal to 2 cm.). Describe a circle touching OA, OB produced and the given circle externally. Calculate and measure the radius of the circle. 9

WEDNESDAY, 6TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HISTORY OF ROME.

N.B.—The answers to the two sections should be given in separate books.

SECTION I.

1. Give an account of the Comitia Centuriata, its constitution and powers. 12

2. Write short notes on "Passing an army under the yoke", "A Triumph", Prætor, Dictator, Tribune of the Plebs. 12

3. Trace the career of Hannibal to his victory at Cannæ. 13

4. Give an account of the reforms of Tiberius Gracchus. 13

SECTION II.

5. Describe the policy and the principles of the two political parties n Rome from the death of Sulla to the rise of Julius Cæsar. 13

6. What do you know of Catiline and his conspiracies? 12

7. Give an account of the Second Triumvirate to the battle of hilippi. 12

8. Show how Augustus became practically a monarch but with republican titles. 13

III.

INTERMEDIATE ARTS EXAMINATION.

EXAMINERS.

The Rev. J. DEVINE, S.J.	In English.
The Rev. JOHN MCKENZIE, M.A.	
N. S. PANSE, B.A.	In Sanskrit.
P. V. KANE, M.A., LL.B.	
The Rev. A. AILINGER, S.J.	In Latin.
N. S. TAKAKHAV, M.A.	
EZEKIEL MOSES EZEKIEL, B.A.	In Hebrew.
The Rev. A. REMBOLD, S.J.	
SHAIKH FAIZULLABHAI L. MULLA, B.A.	In Arabic.
JEHANGIR E. DAVAR, O. I. P.	In French.
LOUIS PELTIER, B.A., B.Sc., O. I. P.	
B. T. ANKLESARIA, M.A.	In Avesta and Pahlavi.
D. M. MADAN, M.A., LL.B.	
MUHAMMAD ABBAS, M.A.	In Persian.
A. S. SHAH, ESQ.	
R. G. BHADKAMKAR, M.A.	In Pali.
D. KOSAMBI, ESQ.	
R. P. PARANJPYE, B.Sc., M.A.	In Mathematics.
JOHN MACLEAN, M.A., B.Sc.	
K. R. KANITKAR, M.A., B.Sc.	In Physics.
The Rev. A. STEICHEN, S.J.	
The Rev. J. R. CUTHBERT, M.A.	In Logic.
V. A. SUKHTANKAR, Ph.D.	

WEDNESDAY, 30TH OCTOBER.
[10 30 A M. TO 1-30 P.M.]

ENGLISH (*Text Books*).

1. BURKE—Reflections on the French Revolution.
2. MILTON—Paradise Lost, Book II.
3. TENNYSON—Lancelot and Elaine.

N.B.—The answers to the two sections to be written in separate book-

SECTION I.

1. Paraphrase :—

"Either to disenthrone the King of Heaven
We war, if war be best, or to regain
Our own right lost. Him to unthrone we then
May hope, when everlasting Fate shall yield
To fickle Chance, and Chaos judge the strife.
The former, vain to hope, argues as vain

The latter; for what place can be for us
Within Heaven's bound, unless Heaven's Lord Supreme
We overpower? Suppose he should relent,
And publish grace to all, on promise made
Of new subjection; with what eyes could we
Stand in his presence humble, and receive
Strict laws imposed, to celebrate his throne
With warbled hymns, and to his Godhead sing
Forced Halleluiahs, while he lordly sits
Our envied sovran, and his altar breathes
Ambrosial odours and ambrosial flowers,
Our servile offerings?"

2. What were Moloch's arguments in favour of open war, and how did Belial reply to them? 15

3. Scan and comment on the versification of the following passages:— 12

(a) O'er many a frozen, many a fiery Alp,
Rocks, caves, lakes, fens, bogs, dens and shades of death.

(b) The intricate wards, and every bolt and bar
Of massy iron or solid rock with ease
Unfastens. On a sudden open fly,
With impetuous recoil and jarring sound,
The infernal doors.

(c) The hard earth shake and a low thunder of arms.

4. Give a short critical sketch of "Lancelot and Elaine," laying especial stress on the contrast of characters. 20

5. Explain the meaning of any eight of the following words and phrases: slightly seamed; a touch of earth; livest between the lips, the low sun makes the colour; the dread Pendragon, strange-statued gate; mazed at her; sea was her wrath: Lancelot of the Lake; the fire of God; Agned-Cathregonion; rathe. 12

SECTION II.

6. State clearly what you conceive to have been Burke's purpose in writing the *Reflections*. 12

7. By what cementing factors, according to Burke, did the National Assembly, having destroyed the unity of the nation, seek to reunite it? 16

8. Explain what Burke means by his distinction between the "age of chivalry" and that of "sophisters, economists, and calculators". 15
Comment on the distinction.

9. To what two classes of men does Burke trace the origin of the Revolution? How does he regard their influence as having operated? 16

10. Explain the following so as to bring out the meaning clearly:— 16

(a) I must bear with infirmities until they fester into crimes.

(b) You have settled by an economy as perverted as the policy, two establishments of government, one real, one fictitious.

(c) Too much and too little are treason against property.

(d) The tenant right of a cabbage-garden, a year's interest in a hovel, the good-will of an ale-house or a baker's shop, the very shadow of a constructive property..............

FRIDAY, 1ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

ENGLISH (*Composition*).

Write an Essay on :—

"Liberty without wisdom and without virtue is the greatest of all possible evils."

THURSDAY, 31ST OCTOBER.
[2-30 P.M. TO 5-30 P.M.]

SANSKRIT.

1. S'ivâditya—Saptapadârthi.
2. Bhavabhûti—Mâlatî Mâdhava.

N. B.—The answers to the two sections should be written in separate books.

SECTION I.

1. (*a*) Correct or justify the following definition :—

चक्षुर्मात्रग्राह्यो गुणो रूपम् ।

(*b*) State the points of resemblance and difference between द्रव्य and गुण, संयोग and समवाय and प्रागभाव and प्रध्वंसाभाव.

2. Explain fully :—

(*a*) कर्म कर्मत्वजातियोगि आद्यसंयोगविभागयोरसमवायिकारणं च ।

(*b*) द्रव्यानारम्भकं कार्यद्रव्यमन्त्यावयवि ।

(*c*) गुणादिषु च संख्याव्यवहारः संख्याप्रत्यासत्तिनिबन्धनः ।

(*d*) विनाशस्तु द्रव्यस्य समवाय्यसमवायिकारणनाशाभ्याम् । गुणस्य तु समवाय्यसमवायिनिमित्तकारणनाशविरोधिगुणेभ्यो विनाशः ।

(*e*) असमवायिकारणं द्रव्यकर्मणोः संयोग एव ।

3 (*a*) State the definition of असमवायिकारण and explain it with reference to the two examples *viz.* तन्तुसंयोग as the असमवायिकारण of पट and तन्तुरूप as that of पटरूप.

(*b*) Give the intimate and non-intimate causes in the case of the perception of sound.

4. (*a*) Distinguish clearly between the केवलान्वयी हेतु and केवलव्यतिरेकी हेतु, अनैकान्तिक and विरुद्ध, and विरुद्ध and कालात्ययापदिष्ट. 11

(*b*) State in Sanskrit in the *Parárthanumána* form the following argument :—

Chandragupta was really competent to rule, for we know he was wise, and it is the wise only who are fitted to rule.

Or

Men are rational animals, parrots are not rational animals: Therefore parrots are not men.

5. Translate :— 10

तदनु ताड्यमानेव तरलितलताविटपेन मलयपवनेन, भर्त्स्यमानेव परभृतवाचा वसन्तेन, तर्ज्यमानेव चलितकिसलयाङ्गुलिभिरशोकैः, हुंक्रियमाणेव मधुकरझङ्कारिणा माकन्दवनेन, विह्वलान्तःकरणा कमलसरस्तीरमिदमाससाद। अत्र कमलपरिमलहारिणा मदकलकलहंसमिथुनविरुतमुखरेण लुलितकुमुदवनधूलीधूसरेण तनुतरतरङ्गशिशिरशीकरवर्षिणा शीतलस्पर्शेन जलमारुतेनापि चित्तसंतापमवाप। ततो विततसरोवीचिशिखरविहरमाणतरुणसारसमिथुनसरसरसितताडितश्रवणा सरभसमासन्नमिमं लतामण्डपमलंचकार।

SECTION II.

6. Translate into Sanskrit :— 12

The royal father, hearing that the prince would enjoy wandering through the gardens, first ordered all his attendants to adorn and arrange them, to make level and smooth the king's highway, and to remove from it all such persons as were old, diseased, deformed or poverty-stricken, so that his son might see nothing likely to afflict his heart. When the king's orders were carried out, the prince was invited by his loving father to an audience. The king seeing his son approach, patted his head and looked at him with mingled feelings of joy and sorrow.

7. Translate into English :— 12

(*a*) असारं संसारं परिमुषितरत्नं त्रिभुवनं
निरालोकं लोकं मरणशरणं बान्धवजनम्।
अदर्पं कन्दर्पं जननयननिर्माणमफलं
[illegible] कथमपि विधातुं व्यवसितः॥

(*b*) उत्फुल्लार्जुनसर्जवासितवहत्पौरस्त्यझञ्झामरु-
त्प्रेङ्खोलस्खलितेन्द्रनीलशकलस्निग्धाम्बुदश्रेणयः ।
धारासिक्तवसुन्धरासुरभयः प्राप्तास्त एतेऽधुना
घर्माम्भोविगमागमव्यतिकरश्रीवाहिणो वासराः ॥

c) Dissolve the compounds underlined and name the metres of (*a*) and (*b*).

8. Explain clearly, with brief reference to the context, the following :— 13

(1) यच्च किल कौशिकी शकुन्तला दुष्यन्तमप्सराः पुरूरवसं चकम इत्याख्यानविद आचक्षते वासवदत्ता च सञ्जयाय राज्ञे पित्रा दत्तमात्मानमुदयनाय प्रायच्छदित्यादि तदपि साहसाभासम् ।

(2) नित्यं न्यस्तषडङ्गचक्रनिहितं हृत्पद्ममध्योदितं
पश्यन्ती शिवरूपिणं लयवशादात्मानमभ्यागता ।

(3) प्रायेण बान्धवसुहृत्प्रियसङ्गमादि
सौदामिनीस्फुरणचञ्चलमेव सौख्यम् ।

(4) साधु सखे भूरिवसो साधु। प्रभवति निजस्य कन्यकाजनस्य महाराज इत्युभयलोकाविरुद्धं वचनमुपन्यस्तम् ।

(5) तदनेन तीर्थेन घटेत तत्प्रतिच्छन्दकमुपोद्घातेन (*v. l.* उपोद्घाताय) माधवान्तिकमुपेयादित्यभिप्रायः ।

(6) सङ्गमः कर्मणां भेदाद्यदि न स्यान्न नाम सः ।
(*v. l.* स्यादनागमः)

Discuss the various readings in (5) and (6).

9. Write notes on the following :—

(1) इष्टाय पूर्ताय च कर्मणेऽर्थान्; (2) the situation of पद्मावती; (3) पूर्णपात्रम्; (4) काकतालीयम्; (5) तारामैत्रकम्; (6) लोकालोक; (7) आमुष्यायण; (8) बोधिसत्त्व.

10. "Bhavabhûti is a master of style and expression and his cleverness in adapting his words to the sentiment is unsurpassed."

Illustrate this remark with quotations from the Mâlatîmâdhava.

Or

Bring out the salient features of the character of Mâlatî. Support your answers by references to the text.

THURSDAY, 31ST OCTOBER.
[2-30 P.M. TO 5-30 P.M.]

PALI.

Majjhimanikāya and *Dhammapada*.

N.B.—The answers to the two sections to be written in separate books.

SECTION I.

1. Translate into English :— 15

(*a*) बाहुक अधिकक्कञ्च, गयं सुन्दरिकामपि,
सरस्सतिं पयागञ्च, अथो बाहुमतिं नदिं ॥
निच्चम्पि बालो पक्खन्तो कण्हकम्मो न सुज्झति,
किं सुन्दरिका करिस्सति, किम्पयागो, किम्बाहुका नदी ॥
वेरिं कतकिब्बिसं नरं न हि नं सोधये पापकम्मिनं ॥
सुद्धस्स वे सदा फग्गु, सुद्धस्सुपोसथो सदा,
सुद्धस्स सुचिकम्मस्स सदा सम्पज्जते वतं ॥
इधेव सिनाहि ब्राह्मण, सब्बभूतेसु करोहि खेमतं ॥
सचे मुसा न भणसि, सचे पाणं न हिंससि,
सचे अदिन्नं नादियसि, सद्दहानो अमच्छरी,
किं काहसि गयं गन्त्वा, उदपानोऽपि ते गया ॥

(*b*) सो एवं समाहिते चित्ते परिसुद्धे परियोदाते अनङ्गणे विगतूपक्किलेसे मुदुभूते कम्मणिये ठिते आनेञ्जप्पत्ते पुब्बेनिवासानुस्सतिञाणाय चित्तं अभिनिन्नामेसिं. सो ऽहं अनेकविहितं पुब्बेनिवासं अनुस्सरामि, सेय्यथीदं—एकम्पि जातिं द्वे ऽपि जातियो तिस्सो ऽपि जातियो चतस्सो ऽपि जातियो पञ्च ऽपि जातियो दस ऽपि जातियो वीसतिम्पि जातियो तिंसम्पि जातियो चत्तारीसम्पि जातियो पञ्ञासम्पि जातियो जातिसतम्पि जातिसहस्सम्पि जातिसतसहस्सम्पि, अनेके ऽपि संवट्टकप्पे अनेके ऽपि विवट्टकप्पे अनेके ऽपि संवट्टविवट्टकप्पे अमुत्रासिं एवन्नामो एवंगोत्तो एवंवण्णो एवमाहारो एवंसुखदुक्खपटिसंवेदी एवमायुपरियन्तो, सो ततो चुतो इधूपपन्नो ऽ ति. इति साकारं

सउद्देसं अनेकविहितं पुब्बेनिवासं अनुस्सरामि. अयं खो मे ब्राह्मण रत्तिया पठमे यामे पठमा विज्जा अधिगता, अविज्जा विहता विज्जा उप्पन्ना, तमो विहतो आलोको उप्पन्नो, यथा तं अप्पमत्तस्स आतापिनो पहितत्तस्स विहरतो.

2. Summarise briefly *in Pali* the चूळमालुङ्क्यसुत्त.

3. Give *Sanskrit* equivalents for :—

गत्तं, उट्ठितो, हत्थिगवास्सवळवं, संकिलेसधम्मं, किच्छं, अद्धानमग्गपटिपन्नो and अञ्ञात.

4. Translate into English :—

लोकाधिपच्चं विपुले धने च
मनोनुकूले तनये च दारे ।
लद्धाऽपि या येति न जातु तित्ति
बाधेतु सा तं न पपंचतण्हा ॥ १ ॥

वण्णप्पसादा यससा सुखा च
धना च हायन्तुपजीविता च ।
येनाभिभूता रिपुनेव सत्ता
दोसग्गि सो तं हदयं जहातु ॥ २ ॥

खेदो विपत्तीसु पटिक्रिया न
तस्मा न दीनप्पकतिं भजेय्य ।
पञ्ञानुयातं विरियं वदन्ति
सब्बत्थ सिद्धिग्गहणग्गहत्थं ॥ ३ ॥

SECTION II.

5. Explain with reference to the context :— 1

(*a*) एकायनो अयं भिक्खवे मग्गो सत्तानं विसुद्धिया.

(*b*) सेय्यथापि भिक्खवे उभतोमुखा मुटोळी पूरा नानाविहितस्स धञ्ञस्स.

(*c*) पुन च परं भिक्खवे भिक्खु सेय्यथापि पस्सेय्य सरीरं सीवथिकाय छड्डितं काकेहि वा खज्जमानं कुललेहि वा खज्जमानं.

(*d*) कथञ्च भिक्खवे भिक्खु चित्ते चित्तानुपस्सी विहरति.

6. Translate into English :— 15

(*a*) उट्ठानेनप्पमादेन सञ्ञमेन दमेन च ।
दीपं कयिराथ मेधावी यं ओघो नाभिकीरति ॥

(*b*) मलित्थिया दुच्चरितं, मच्छेरं ददतो मलं ।
मला वे पापका धम्मा अस्मिं लोके परम्हि च ॥
ततो मला मलतरं अविज्जा परमं मलं ।
एतं मलं पहत्वान निम्मला होथ भिक्खवो ॥

(*c*) असतं भावनमिच्छेय्य पुरेक्खारञ्च भिक्खुसु ।
आवासेसु च इस्सरियं पूजा परकुलेसु च ॥
ममेव कतमञ्ञन्तु गिही पब्बजिता उभो ।
ममेव अतिवसा अस्सु किच्चाकिच्चेसु किस्मिचि ॥
इति बालस्स सङ्कप्पो इच्छा मानो च वड्ढति ॥
अञ्ञा हि लाभूपनिसा अञ्ञा निब्बाणगामिनी ।
एवमेतं अभिञ्ञाय भिक्खु बुद्धस्स सावको ।
सक्कारं नाभिनन्देय्य विवेकमनुब्रूहये ॥

7. Write explanatory notes upon :— 10

अविज्जा, अप्पमाद, मनोपुब्बंगमा धम्मा, भिक्खु, निरय, and अत्ता.

8. Translate into Pali :— 13

Then the Exalted One proceeded to the Service Hall, and sat down there on the seat prepared for him. And when he was seated the Exalted One addressed the brethren, and said —

"Therefore, O brethren—ye to whom the truths I have perceived have been made known by me—having thoroughly made yourselves masters of them, practise them, meditate upon them, and spread them abroad; in order that pure religion may last long and be perpetuated, in order that it may continue to be for the good and happiness of the great multitudes, out of pity for the world, to the good and the gain and the weal of gods and men!

INTERMEDIATE ARTS EXAMINATION, 1912.

THURSDAY, 31ST OCTOBER.
[2-30 P.M. TO 5-30 P.M.]

ARABIC.

1. Translate :— 2

(a) فقل للّذين استعذبوا الغدرَ مشربا
رويدا فمرعى الغادرين وبيل
اديروا كؤس الراح ان وراءها
كؤسا من السم الذعاف تغول
وجّروا ذيول الخفض حتي تزوركم
مشمرة ليست لهن ذيول
جنود طلاع الارض يحمي لواءها
قؤول لما قال الكرام فعول

(b) سعدت بطول بقاءک الحقب
وغدت مقر علاءک الرتب
انت الذي انقاد الزمان له
طوعا ودان العجم والعرب
انت الذي قسم القضا وله
فوق الرجاء ودون مايجب
انت الذي لولا مكارمه
غاض الزلال وصوح العشب
مازال من قوم نعيمهم
الا وانت لرده سبب

(c) حدّث دلشاد غلام عبد الله بن موسی قال كنت انا وثقيف الخادم الاسود مولی الفضل بن الربيع نضارب مولاي عبد الله بن موسی وقد اخذ النبيذ

من الجماعت فضرب عبد الله وثقيف صوتا فاختلفا
فيه وتشاجرا فقال عبد الله كذا اخذته من منصور
زلزل - وقال ثقيف كذا اخذته منه وطال تشاجر
هما فيه - وكان معربدا يذهب عقله من ادنى شى
يشرب وكان عبد الله ايضا معربدا فغضب ثقيف
ورفع العود وهو لا يعقل - فضرب به راس عبد الله
بن موسى فطوقه اياه - وابدر خدم عبد الله فقال
لهم عبد الله بن موسى لا تمسوه واخرجوا العود
من عنقى فاخرجوه وكان عبد الله بن موسى اشد
خلق الله عربدة ايضا فرزق في ذلك اليوم حلما لم
ير مثله وقال لخدمه - إن قتلته قتلت كلبا وتحدث
الناس بذلك ولكن اخلعوا عليه وهبوا له ولا يدخل
منزلي ابدا

15

2. Explain :—

(a) و إقام بباب الوليد لا يخلص اليه

(b) بعث الحاجب الى طريح وقد تتامّ الناس

(c) ولك ما تحبّه من جهتي مع عرض من الاعراض
مع رضاء الخليفة

(d) فاقمت عندهم حتى آسحرت

(e) هذا يخلط الاوتار تخليط متعنت فهو لا يالو
ما افسدها

(f) ويصبو اليه التاج وهو له اخ

(g) وارم الصفوف بمثلهنّ وشنّها
شعواء ينسى عندها صفّينا

(h) لك الله هل عهد الشبيبة يرجع

(h) اليك شهاب الدين بردا آثاره
لسان وسداه لمجدك اصبع

(l) فقد وجد الواشون سوقا ونفقوا
بضائع زور ما لهن دوام

3. Paraphrase — 12

(a) فليهنها الايام انك مالك الد
نيا وطوع مرادك الاقدار
يا مالك الدنيا الذي بشبيهه
عقم الزمان وضنت الادوار
او لبتني النعم التي سارت بها
الركبان و امتلأت بها الاقطار
و رفعت ذكري بعد طول خموله
فكانني علم عليه نار
وكفيتني منن الرجال ولم تزل
منن الرجال تعافها الاحرار

(b) سرى يكتسي قطعا من الليل مظلما
نزيع كرى اهوى اليّ فسلّما
ولله ذاك الخشف خلى كناسه
وحل بوسط الغاب يطرق ضيغما
سرى عاطلا حتى اعتنقنا فلم تزل
دموعي تكسوه الجمان المنظما
وبتنا على رغم الغيور بغبطة
خليطين ما نمتاز الا توهما

4. Reproduce in Arabic either one of the stories or the analysis of one of the poems you have read. 8

5. Quote 3 instances of (1) exaggeration (المبالغة) (2) 3 of maxims (المثل); and (3) 3 of (المناسبة) or balanced verses, in which الطغرائى abounds. 6

6. Write grammatical notes on :— 12

(a) هناك انت و عزمة عصفت
(b) وما انس لا انس الوداع
(c) فغادره نضوا خيل المضارب
(d) ويا نار قلبي مالجمرك
(e) ولا وقفتي للحادثات تبلدا
(f) احسن فيه كل الاحسان
(g) ويحك ما آجدهم في طلبك
(h) فقال دونكها
(k) فانشد فيها

7. Analyse the sentences in the following lines, explaining their kinds and connectives :—

(a) لا اعدّ الاقتار عدما ولكن
فقد من قد رزيته الاعدام
(b) تزدر امرء

8. Scan the following lines, explaining the بحر and قافيه

(a) و مؤلف الاضداد مجتمعا
فى راحتيه الماء واللهب
(b) هم شرعوا انّ الجفاء محلل
وهم حكموا ان الوفاء حرام
(c) يغلهم بالرعب قبل طرادهم
ويهزمهم بالكتب قبل الكتاب

9. Translate into Arabic :— 15

I was very young when I saw the sea for the first time, and I was struck, as every one must be, with the magnificence of the spectacle, which gave me a better idea of the almighty power of the Creator than I had ever had before. I spent the day in watching the waves, or, if I perceived a distant sail, I followed it with my eyes till it had disappeared beyond the horizon. From that day my strongest desire was to make a sea voyage. In my dreams at night I sailed over the wide ocean to distant lands, and even to the other hemisphere; and by day I read all the books of voyages and travels that I could get hold of.

THURSDAY, 31ST OCTOBER.
[2-30 P.M. TO 5-30 P.M.]

LATIN.

1. VIRGIL—Æneid, B. IX, X.
2. CICERO—Philippica I, and De Amicitia.

SECTION I.

1. Translate :—

(1) " Quo sequar ? aut quae nunc artus avolsaque membra 22
et funus lacerum tellus habet ? hoc mihi de te,
nate, refers ? hoc sum terraque marique secuta ?
Figite me, si qua est pietas, in me omnia tela
conicite, o Rutuli, me primam absumite ferro."

(2) Atque illi medio in spatio chorus, ecce, suarum
occurrit comitum ; Nymphae, quas alma Cybebe
numen habere maris Nymphasque e navibus esse
iusserat, innabant pariter fluctusque secabant.
Adgnoscunt longe regem lustrantque choreis.

(3) Frater tendebat inertes
infelix palmas, curru delapsus eodem :
" Per te, per qui te talem genuere parentes,
vir Troiane, sine hanc animam, et miserere precantis."
Pluribus oranti Aeneas : " Haud talia dudum
dicta dabas. Morere. et fratrem ne desere frater."

N.B.—Scan the lines in 1 : Quo——ferro.

2. Explain the references or allusions and the meaning of the following passages :— 12

(1) Contra Ascanium talia fatur Euryalus : " Me nulla dies tam fortibus ausis dissimilem arguerit : tantum fortuna secunda, haud adversa cadat."

(2) Magnum stridens contorta phalarica venit, fulminis acta modo, quam nec duo taurea terga nec duplici squama lorica fidelis et auro sustinuit.

(3) Fata canens silvis genitor celarat Halaesum ; ut senior leto canentia lumina solvit, iniecere manum Parcae telisque sacrarunt Euandri.

(4) Orodes expirans : " Te quoque fata prospectant paria." Ad quem subridens mixta Mezentius ira : " De me divom pater atque hominum rex viderit."

3. How did Juno come to side with the Latins against the Trojans ? 4

4. Translate :— 14

Alexander, victo apud Issum Dario, ad matrem coniugemque praemisit qui ipsum ad eas visendas venire nuntiarent, brevique post earum tabernaculum intravit cum Hephaestione, qui longe omnium amicorum ei erat carissimus, atque ulli alii libere eum admonendi ius erat ; quo tamen admodum prudenter utebatur. Idem regi par erat aetate, corporis habitu praestabat. Reginae igitur, cum eos una intrantes conspexissent, Hephaestionem regem esse ratae Persarum more veneratae sunt. Cuius erroris Darii mater admonita cum ad Alexandri pedes proiecta veniam imploraret, rex ei sublevatae summa cum benignitate respondit : " Non erras, mater ; namque hic alter Alexander est."

SECTION II.

5. Translate into English :— 15

(*a*) Nam quis est, pro deorum fidem atque hominum! qui velit, ut neque diligat quemquam nec ipse ab ullo diligatur, circumfluere omnibus copiis atque in omnium rerum abundantia vivere? Haec enim est tyrannorum vita, nimirum, in qua nulla fides, nulla caritas, nulla stabilis benevolentiae potest esse fiducia, omnia semper suspecta atque sollicita, nullus locus amicitiae.

(*b*) In talibus ea stabilitas amicitiae confirmari potest, cum homines benevolentia coniuncti primum cupiditatibus iis, quibus ceteri serviunt, imperabunt, deinde aequitate iustitiaque gaudebunt, omniaque alter pro altero suscipiet, neque quicquam unquam nisi honestum et rectum alter ab altero postulabit, neque solum colent inter se ac diligent, sed etiam verebuntur.

(*c*) Sed quid plura de lege disputo? Quasi vero id agatur ut quisquam provocet: id agitur, id fertur, ne quis omnino unquam istis legibus reus fiat. Quis enim aut accusator tam amens reperietur qui reo condemnato obici se multitudini conductae velit, aut iudex qui reum damnare audeat, ut ipse ad operas mercennarias statim protrahatur? Non igitur provocatio ista lege datur, sed duae maxime salutares leges quaestionesque tolluntur.

Explain fully the proposal of Mark Antony referred to in the last sentence.

6. Translate and explain the allusions in :— 10

(*a*) Nam Carbonem, quocumque modo potuimus, propter recentem poenam Tib. Gracchi sustinuimus; de C. Gracchi autem tribunatu quid exspectem, non lubet augurari. Videtis, in tabella iam ante quanta sit facta labes.

(*b*) Nec parasitorum in comoediis adsentatio faceta nobis videretur, nisi essent milites gloriosi.

(*c*) Adduci tamen non possem ut quemquam mortuum coniungerem cum deorum immortalium religione; ut, cuius sepulcrum usquam exstet ubi parentetur, ei publice supplicetur.

7. *N.B.*—Only two of the following three questions (*a*), (*b*), (*c*) are to be answered. 10

(*a*) What are Cicero's views about (1) the relative merits of old and new friends, and (2) the friendship between persons of different social and political standing? Mention some of his illustrations.

(*b*) Give a clear exposition of the changes in the "leges iudiciariae" effected by Aurelius Cotta and Julius Cæsar.

(*c*) What was Cicero's attitude towards the murder of Cæsar, judging from the first Philippic?

8. Tanslate into Latin :— 0

A few years later, a charge was brought against Cicero, by his inveterate enemy, Clodius. He was accused of putting Roman citizens to death without trial. At first Cicero relied on the protection of his friends in the senate, and had high hopes of defending himself. But the growing ill-will of the populace, who had forgotten his past services, forced him to change his plans. He retired into voluntary exile, being followed to the city gates by many of his faithful friends, amid tears and lamentations.

THURSDAY, 31ST OCTOBER 1912.
[2-30 P.M. TO 5-30 P.M.].

HEBREW.

DEUTERONOMY: I KINGS: MICAH.

1. (*a*) Show how Micah's description of the character of the Almighty is unrivalled. 8

(*b*) What contrast do you draw between the 'true prophet' and the 'popular prophet' from the teachings conveyed in Deuteronomy, I Kings and Micah?

2. (*a*) Give the most salient features of the last Blessing of Moses. 8

(*b*) What is the natural foundation of the three great Jewish feasts referred to in Deuteronomy?

3. (*a*) What characteristic similarity do you find between Deuteronomy and I Kings? 10

(*b*) To what authorities does I Kings habitually refer? What is the nature of information thus obtained?

(*c*) What traces of non-Semitic linguistic influence do you find in I Kings? How do you account for the same?

4. How far is Micah's paronomasia illustrated in the names of the following cities:— 7

Gath, Beth le-Aphrah, Zaanam, Beth ezel?

5. Translate into English:— 20

(*a*) יַרְכִּבֵהוּ עַל־בָּמֳתֵי אָרֶץ וַיֹּאכַל תְּנוּבֹת שָׂדָי
וַיֵּנִקֵהוּ דְבַשׁ מִסֶּלַע וְשֶׁמֶן מֵחַלְמִישׁ צוּר׃ חֶמְאַת בָּקָר
וַחֲלֵב צֹאן עִם־חֵלֶב כָּרִים וְאֵילִים בְּנֵי־בָשָׁן וְעַתּוּדִים
עִם־חֵלֶב כִּלְיוֹת חִטָּה וְדַם־עֵנָב תִּשְׁתֶּה־חָמֶר׃ עַמִּים
הַר־יִקְרָאוּ שָׁם יִזְבְּחוּ זִבְחֵי־צֶדֶק כִּי שֶׁפַע יַמִּים יִינָקוּ
וּשְׂפֻנֵי טְמוּנֵי חוֹל׃ וּלְאָשֵׁר אָמַר בָּרוּךְ מִבָּנִים אָשֵׁר
יְהִי רְצוּי אֶחָיו וְטֹבֵל בַּשֶּׁמֶן רַגְלוֹ׃ בַּרְזֶל וּנְחֹשֶׁת
מִנְעָלֶךָ וּכְיָמֶיךָ דָּבְאֶךָ׃ אֵין כָּאֵל יְשֻׁרוּן רֹכֵב שָׁמַיִם
בְּעֶזְרֶךָ וּבְגַאֲוָתוֹ שְׁחָקִים׃

(*b*) וַיְהִי ׀ בַּעֲלוֹת הַמִּנְחָה וַיִּגַּשׁ אֵלִיָּהוּ הַנָּבִיא וַיֹּאמַר
יְיָ אֱלֹהֵי אַבְרָהָם יִצְחָק וְיִשְׂרָאֵל הַיּוֹם יִוָּדַע כִּי־אַתָּה
אֱלֹהִים בְּיִשְׂרָאֵל וַאֲנִי עַבְדֶּךָ ובִדְבָרֶיךָ עָשִׂיתִי אֵת כָּל־
הַדְּבָרִים הָאֵלֶּה׃ עֲנֵנִי יְיָ עֲנֵנִי וְיֵדְעוּ הָעָם הַזֶּה

כִּי־אַתָּה יְיָ הָאֱלֹהִים וְאַתָּה הֲסִבֹּתָ אֶת־לִבָּם אֲחֹרַנִּית׃
וַתִּפֹּל אֵשׁ־יְיָ וַתֹּאכַל אֶת־הָעֹלָה וְאֶת־הָעֵצִים וְאֶת־
הָאֲבָנִים וְאֶת־הֶעָפָר וְאֶת־הַמַּיִם אֲשֶׁר־בַּתְּעָלָה לִחֵכָה׃
וַיַּרְא כָּל־הָעָם וַיִּפְּלוּ עַל־פְּנֵיהֶם וַיֹּאמְרוּ יְיָ הוּא
הָאֱלֹהִים יְיָ הוּא הָאֱלֹהִים׃

(c) וְהָיָה ׀ בְּאַחֲרִית הַיָּמִים יִהְיֶה הַר בֵּית־יְיָ נָכוֹן
בְּרֹאשׁ הֶהָרִים וְנִשָּׂא הוּא מִגְּבָעוֹת וְנָהֲרוּ עָלָיו עַמִּים׃
וְהָלְכוּ גּוֹיִם רַבִּים וְאָמְרוּ לְכוּ ׀ וְנַעֲלֶה אֶל־הַר־יְיָ
וְאֶל־בֵּית אֱלֹהֵי יַעֲקֹב וְיוֹרֵנוּ מִדְּרָכָיו וְנֵלְכָה בְּאֹרְחֹתָיו
כִּי מִצִּיּוֹן תֵּצֵא תוֹרָה וּדְבַר יְיָ מִירוּשָׁלִָם׃ וְשָׁפַט
בֵּין עַמִּים רַבִּים וְהוֹכִיחַ לְגוֹיִם עֲצֻמִים עַד־רָחוֹק וְכִתְּתוּ
חַרְבֹתֵיהֶם לְאִתִּים וַחֲנִיתֹתֵיהֶם לְמַזְמֵרוֹת לֹא־יִשְׂאוּ גּוֹי
אֶל־גּוֹי חֶרֶב וְלֹא־יִלְמְדוּן עוֹד מִלְחָמָה׃ וְיָשְׁבוּ אִישׁ
תַּחַת גַּפְנוֹ וְתַחַת תְּאֵנָתוֹ וְאֵין מַחֲרִיד כִּי־פִי יְיָ
צְבָאוֹת דִּבֵּר׃ כִּי כָּל־הָעַמִּים יֵלְכוּ אִישׁ בְּשֵׁם אֱלֹהָיו
וַאֲנַחְנוּ נֵלֵךְ בְּשֵׁם־יְיָ אֱלֹהֵינוּ לְעוֹלָם וָעֶד׃

6. Translate adding critical notes where necessary :— 2

(1) כי־תצור אל־עיר ימים רבים להלחם עליה
לתפשה לא־תשחית את־עצה לנדח עליו
גרזן כי ממנו תאכל ואתו לא תכרת כי
האדם עץ השדה לבא מפניך במצור׃

(2) אֶפֶס כִּי לֹא יִהְיֶה־בְּךָ אֶבְיוֹן׃

(3) וְהֵרַתִי וְהִפְלֵתִי׃

(4) הֶחָפֵץ יְמַלֵּא אֶת־יָדוֹ וִיהִי כֹּהֲנֵי בָּמוֹת׃

(5) וַיְהִי עַד־כֹּה וְעַד־כֹּה׃

(6) דַבְּרוּ אַל־יִתְהַלֵּל חֹגֵר כִּמְפַתֵּחַ׃

(7) עַד־מָתַי אַתֶּם פסחים עַל־שְׁתֵּי הַסְּעִפִּים׃

Point (1) in the above.

7. Translate into Hebrew :—

A very rich man, who had an only son whom he loved tenderly, made a journey to a distant country, attended by one household slave. While he was there he fell very sick, and determined to make his will, for he saw that his end was near. So he wrote a paper and delivered it into the hand of his slave and expired. The purport of the writing was that he gave all his possessions to his slave, with the reservation that his son should receive any one thing that he might choose. Accordingly the slave gathered everything together and returned home. He there showed his master's son the words which his father had written and asked him to choose his portion.

Now the son had an aged teacher whom he was wont to consult on all matters of difficulty ; so he showed him the whole matter and asked his advice. And the old man said : " Thy father has only done this to bring back to thee all the inheritance. Knowest thou not that everything which a slave possesses belongs to his master ? Go away home, therefore, and choose the slave himself and all shall be thine. "

THURSDAY, 31ST OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

FRENCH.

N.B.—The answers to the two sections should be given in separate books

SECTION I.

1. MOLIÈRE—L'Avare.

1. Translate into English :—

Harpagon.—Comment, pendard ! c'est toi qui t'abandonnes à ces coupables extrémités ? C'est toi qui te veux ruiner par des emprunts si condamnables ! Oses-tu bien, après cela, paraître devant moi ?

Cléante.—Comment, mon pere ! c'est vous qui vous portez à ces honteuses actions ? C'est vous qui cherchez à vous enrichir par des usures si criminelles ! Osez-vous bien, après cela vous présenter aux yeux du monde ?

Harpagon.—N'as-tu point de honte, dis-moi, d'en venir à ces débauches-là, de te précipiter dans des dépenses effroyables, et de faire une honteuse dissipation du bien que tes parents t'ont amassé avec tant de sueurs !

Cléante.—Ne rougissez-vous point de déshonorer votre condition par les commerces que vous faites ; de sacrifier gloire et réputation au désir insatiable d'entasser écu sur écu, et de renchérir, en fait d'intérêts, sur les plus infâmes subtilités qu'aient jamais inventées les plus célèbres usuriers ? Qui est plus criminel, à votre avis, ou celui qui achète un argent dont il a besoin, ou bien celui qui vole un argent dont il n'a que faire ?

Harpagon.—Ote-toi de mes yeux, coquin ; retire-toi, te dis-je, et ne m'échauffe pas les oreilles.

2. Répondez en français à l'une des questions suivantes :—

(*a*) Montrez que ce jugement de Goethe est bien fondé : L'*Avare* est tragique, parce que le vice d'Harpagon détruit toute la piété qui unit le père et le fils.

(*b*) Enumérez les principaux traits d'avarice dont fourmille le rôle d'Harpagon.

3. Give a sketch and an appreciation of the character of Molière. 15

4. Translate into French :— 7

The *Avare* constitutes a most remarkable example of the originality of Molière's imitation... While Plautus may be said to aim at depicting a situation rather than a character, Molière transforms this central situation of his Latin model into the secondary episode of a powerful comédie de caractère The poverty-stricken Euclio, in the opinion of his neighbours, is 'not a bad fellow at all', and his miserliness only stands revealed when he discovers the pot of gold which a French critic has playfully alleged to be the principal personage of the *Aulularia* It remained for Molière to create for all time the type of ingrained, unscrupulous, inexorable, and brutal avarice.

SECTION II.

A THIERRY—Récits des Temps Mérovingiens.

5. Translate into English :— 15

(*a*) La première pensée de la nouvelle convertie (c'était le nom qu'on employait alors pour exprimer le renoncement au monde) fut de se dépouiller de tout ce qu'elle portait sur elle de joyaux et d'objets précieux. Elle couvrit l'autel de ses ornements de tête, de ses bracelets de ses agrafes de pierreries, de ses franges de robe tissues de fil d'or et de pourpre ; elle brisa de sa propre main sa riche ceinture d'or massif en disant : " Je la donne aux pauvres " ; puis elle songea à se mettre à l'abri de tout danger par une prompte fuite. Libre de choisir sa route, elle se dirigea vers le Midi, s'éloignant du centre de la domination franke par l'instinct de sa sûreté, et peut-être aussi par un instinct plus délicat qui l'attirait vers la région de la Gaule où la barbarie avait fait le moins de ravages ; elle gagna la ville d'Orléans et s'y embarqua sur la Loire, qu'elle descendit jusqu à Tours.

(*b*) Parmi ceux de nouveaux convertis que le roi Hilperik avait honorés de la faveur de sa paternité spirituelle, se trouvait un certain Phatir, originaire du royaume des Burgondes et récemment établi à Paris. Cet homme, d'un caractère sombre, n'eut pas plus tôt abjuré la foi de ses ancêtres, qu'il en conçut un profond regret ; le sentiment de l'opprobre où il se voyait tombé lui devint bientôt insupportable. L'amertume de ses pensées se tourna en jalousie violente, contre Priscus, qui, plus heureux que lui, pouvait marcher la tête haute, exempt de la honte et du tourment qui rongeait le cœur d'un apostat.

6. Traitez en français l'un des sujets suivants :— 15

(*a*) La vie de Fredegonde d'après les Recits des Temps Mérovingiens.

(*b*) Le complot tramé par Leudaste, le prêtre Rikulf, et le sous-diacre Rikulf contre l'évêque Grégoire de Tours. Le procès de l'évêque et son résultat.

7. Write short notes on *Prætextatus, Bishop of Rouen ; poet Fortunatus ; leudes ;* and *loi salique.* 10

8. Translate into French :— 10

Turning her thought more and more from the men and things of that century of violence and brutality, she saw with terror the approach of the moment of becoming wife of the king whose captive she was. When the order was given to bring her to the royal residence for the celebration of the marriage, urged by an instinct of invincible repugnance, she took to flight ; but was overtaken, brought back, and against her will, was married at Soissons and became queen of the Neustrian Franks. Inexpressible disgust, which could not be lessened for a soul like that of Radegond by the attraction of power and riches, followed this forced union between the barbarian king and the woman who was irretrievably estranged from him by all the moral perfections, which he himself had rejoiced to find in her and which he himself had caused to be cultivated in her.

THURSDAY, 31ST OCTOBER.
[2-30 P. M. TO 5 30 P M]

AVESTA AND PAHLAVI.

N. B.—The two sections should be answered in separate books.

SECTION I.

Avesta—Yashts, Hormazd and Mihir.

1. Translate into English :— 20

(*a*) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(*b*) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(*c*) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

2. Translate into Avesta — 8

Ahura Mazdâ spoke to Spitama Zarathustra "I created, O Spitama Zarathustra! the star Tistrya as worthy of worship, as worthy of praise, as worthy of propitiation, as worthy of glorification as myself, Ahura Mazdâ. Had I not created the star Tistrya, then all day long, all night long, that Pairika Duzyâiryâ would wage war against this material world of mine"

3 Comment on the following remark of Darmesteter — 7

"The Ormazd Yast from § 24 to the end, is supposed by the Parsis to be a fragment of the Bahman Yast"

4 Give a short description of Mithra as a *Yazata* of the Avesta literature, explaining briefly some of the most common attributes ascribed to him 7

5. Annotate — 8

[illegible]

[illegible]

[illegible]

[illegible]

SECTION II.

Pahlavi – Zand î-Vôhûman Yasht.

6 Translate into English — 22

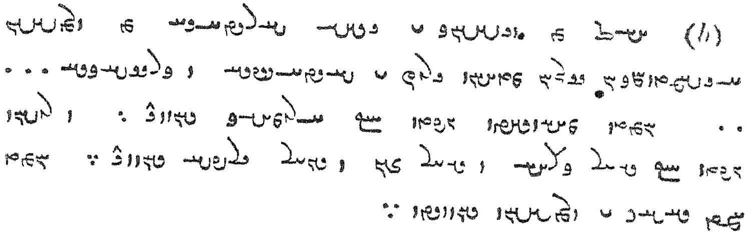
(a) [illegible]

[illegible]

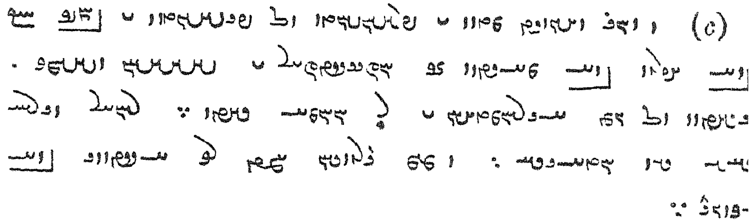
[illegible]

[illegible]

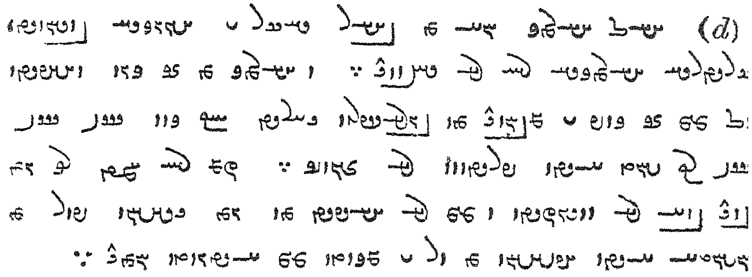
(b)



(c)



(d)



(e) Transliterate into English the passages marked (b) and (c) above substituting Aryan Pahlavi (not Pâzend) words for the Semitic wherever possible.

7 Write short notes on:—

- (a) Mazdak î-Bâmdâtân
- (b) Bakht Âfrîd
- (c) Peshôtan-î-Bâmîk.
- (d) Mâhvindât.
- (e) Dwâzdahômâst.

8 (a) Give with reasons the approximate date of the composition of the *Zend-i-Vohuman Yasht* from the intrinsic evidence of the text.

(b) What importance do you attach to the so-called prophecie and forecasts contained in the *Zend-i-Vohuman Yasht*?

9. Translate into Pahlavi :—

Three hundred years after the death of our holy prophet Spitama Zarathushtra, the accursed Alexander, king of Arum, destroyed the sovereignty of Persia and killed its king. The holy Mazdayasnian religion was then not accepted in its pristine purity, and many people were sceptical of its truth and greatness. Âdarbâd, son of Mahrospend, the Dastur of Dasturs, gave new vigour to the holy faith. This was when the Sassanian dynasty was in power in Persia—the dynasty which was founded by Ardashîr Bâbagîn.

THURSDAY, 31ST OCTOBER.
[2 30 P.M. TO 5-30 P.M.]

PERSIAN.

1. SHAIKH 'ALI HAZUR—Tārikhe-Ahwāl.

2. NESHAT—Odes 1 to 60.

N. B.—The answers to the two sections to be written in separate books

SECTION I.

1. Translate :—

(a) وقت آن شد که ز میخانه درآیم سرمست
لب ساغر بلب و طرهٔ ساقی در دست
کف زنان دست فشان بر دو جهان از دو جهان
پرده بردارم و بیرون فگنم هرچه که هست
تا که آید بمیان تیغ بر آرم ز نیام
تا که افتد بنشان تیر کشایم از دست
جام کز دست نگارست چه شیرین و چه تلخ
جا که در مجلس یارست چه بالا و چه پست
نه همین از تو نصیب دل ما آزارست
جز خرابی نکند هرکه درین خانه نشست
تا بدانی که بجز سوی تو پروازم نیست
بال بکشا و نگهدار سر رشته بدست
عجبی نیست که جز سوی تو رفتارم نیست
که بیکسوی رود ماهی افتاده بشست

بدلی زخم مزن ور بزنی رحم میار
که چو بشکست بهم شیشه نشاید پیوست
زحمت خرقه و سجادة برم چند نشاط
همه دانند که من رندم و دیوانهٔ و مست

(b) سکنهٔ شهر در اضطراب افتادند و اکثر ایشانرا طاقت حرکت نبود و از دهشت رومیه اطمینان هم نداشتند - فزع قیامت برخاست - امیر حسن بیگ بمنزل آمد و مردم شهر نیز جمع آمدند و هرگونه گفتگوئی درمیان گذشت - من حرکت مردم را بیرون از قدرت ایشان دیدم و خرابی آن شهر را که رشک گلستان ارم بود و خلقی عظیم را خراب ترازان بدست خود نمودن و عجزة واطفال و عیال ایشانرا سر بصحرای هلاکت دادن نه پسندیدم - امیر مذکور را اشارت بماندن و حراست خود و مردم را دلالت و تحریض باتفاق و سامان یراق و پاس حزم و مردانگی نمودم - سخنان من موثر و مقبول همه افتاد - باهم عهد و پیمان کردة هرکس سلاح و یراق حرب بر خود آراست

2. Write full notes on :— 15

علت غائی - خونبها - شه لولاک - شیخ الاسلام - حکمت اشراق - خوارج - قزلباش - شبگیر

3. Give a sketch of Nishat's life and character. 7

4. What do you know of the Ṣafawi Kings of Persia? In what terms does Hazin speak of them in the Tārikh-i Ahwāl? What causes, according to him, brought about the downfall of their dynasty? 8

SECTION II

5 Translate and explain :—

(a) چو اوست اول و آخر هم اوست نیست نشاط
براه عشق تفاوت درنگ را ز شتاب

(b) زاهد از ره ندهد خانهٔ خماری هست
وجه می ار نرسد خرقهٔ و دستاری هست

(c) نه عکس شخص و نه ظل و نه موج بحر و نه یم
که ظل و شخص و یم و موج جمله خویشتن ست

(d) شد رشک طور ز آمدنت کوی عاشقان
بنشین که باد خردهٔ جانها سپند تو

6. What knowledge do you gather, from the Tārikh-i Ahwāl, of the state of learning and literature in Persia during Hazin's life time?

7. Translate into Persian —

"There is no compulsory education in Persia and very little free education. There was one man who tried to atone for sins which he made no pretence of giving up, by founding a large free school in one Persian town, but it is not a common form of benevolence. So it is only those who can spare a little money who send their boys to school, and a great many never get beyond a very early stage of reading and writing. As for girls very few parents care to waste their money over their girls' education. A certain number are taught to read the Quran, a less number go on to reading such books as they have studied, but very few can read at sight, and writing is even rarer. Still in the matter of the education of girls Persia is in advance of other Muhammadan countries."

WEDNESDAY, 30TH OCTOBER.
[2-30 P.M. TO 5-30 P.M.]

TRIGONOMETRY

N.B.—The answers to the two sections must be written in two separate boo
Only *four* questions from each section should be attempted.

SECTION I.

1. Define the trigonometrical ratios of *any* angle and prove that $\sin\left(\frac{\pi}{2} - A\right) = \cos A$ for all values of the angle A.

Prove that—

(1) $1 + 2(\sin^6 a + \cos^6 a) = 3(\sin^4 a + \cos^4 a)$

(2) $\dfrac{1 + \cos A}{\sec A - \tan A} - \dfrac{1 - \cos A}{\sec A + \tan A} = 2(1 + \tan A)$.

2 Show how to construct geometrically an angle whose cosine is a known negative quantity. 12

Divide a right angle into two parts so that the cosine of one part may be double the other. Give a geometrical construction.

Trace the changes in sign and magnitude of $\sin\theta - \cos\theta$ as θ increases from 0 to 360° and illustrate by means of a graph.

3 (1) Prove the formula for $\cos(A - B)$ in terms of the sines and cosines of A and B, supposing all the angles to be positive and acute. 14

(2) If $\cos A = \frac{a^2 - 1}{a^2 + 1}$ and $\cos B = \frac{b^2 - 1}{b^2 + 1}$ where A and B are positive acute angles, show that—

$$\sin^2 \tfrac{1}{2}(A - B) = \frac{(a - b)^2}{(a^2 + 1)(b^2 + 1)}.$$

(3) If $\cos\theta = \frac{\cos\phi - c}{1 - c\cos\phi}$, prove that $c = \dfrac{\tan^2\frac{\theta}{2} - \tan^2\frac{\phi}{2}}{\tan^2\frac{\theta}{2} + \tan^2\frac{\phi}{2}}$.

4 Find sin 15° and cos 15° and show that tan 15° + cot 15° = 4. 14

Show that

$$\sin\frac{\pi}{24} = \tfrac{1}{4}(1 + \sqrt{2} - \sqrt{3})\sqrt{2 - \sqrt{2}}$$

5 (1) If $A + B + C = 90°$, prove that 12

$$\cot A + \cot B + \cot C = \cot A \cot B \cot C.$$

(2) If $A + B + C = \pi$, prove that

$$\cos A + \cos B + \cos C = 1 + 4\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}.$$

(3) If $A + B + C + D = 2\pi$, prove that

$$\cos(B + C + D) + \cos(C + D + A) + \cos(D + A + B)$$
$$+ \cos(A + B + C) + 4\cos\frac{A + B}{2}\cos\frac{A + C}{2}\cos\frac{A + D}{2} = 0.$$

SECTION II.

6 Show that in any triangle the sides are proportional to the sines of the opposite angles. 13

Through the angular point C of a triangle is drawn any line CMN on which are dropped perpendiculars AM and BN. Prove that

$$MN = AM\cot B \sim BN\cot A.$$

7. Prove the formula $\cos\frac{C}{2} = \sqrt{\frac{s(s - c)}{ab}}$. 14

(1) In any triangle a, b, c are in arithmetical progression; prove that $\cot\frac{A}{2}$, $\cot\frac{B}{2}$, $\cot\frac{C}{2}$ are so also.

(2) If γ be the line drawn to the base bisecting the vertical angle C, prove that

$$\gamma = \frac{2ab}{a + b}\cos\frac{C}{2}.$$

8 Show how to solve a triangle knowing two sides and the angle opposite to one of them, find under what circumstances there are two solutions. 14

C = 44° 26′, a = 43·65 ft., c = 40·46 ft., find A and B reater value of b, given the following extracts from the tables :—

Logarithms.

	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7

Logarithmic Sines

	0′	6′	12	18′	24′	30′	36′	42′	48′	54′	1	2	3	4	5
41°	9 8418	8426	8433	8441	8449	8457	8464	8472	8480	8487	1	3	4	5	6
49°	9 8778	87 4	8791	8797	8804	88 0	8817	8823	8 30	8836	1	2	3	4	5
86°	9 9989	9990	9990	9991	9991	9992	9392	9993	9993	9994	0	0	0	0	0

9 Find the general expression for all angles which have the same sine as α. 14

Solve the equations—

$$(1)\ \sec^2 x + \operatorname{cosec}^2 x = 3 \sec^4 x\ ,$$

$$(2)\ (4 \sin^2 x - 1)(4 \sin^2 2x - 1) = 1.$$

10. (1) In any triangle right-angled at A prove that 15

$$\tan \frac{B}{2} + \tan \frac{C}{2} = \frac{a(a+b-c)}{(a+b)(a+c)}.$$

(2) Show that

$$\frac{\sin 5\theta + \cos 5\theta}{\sin \theta + \cos \theta} = 2 \cos 4\theta + 2 \sin 2\theta - 1.$$

(3) If $\dfrac{\tan(\alpha+\beta-\gamma)}{\tan(\alpha-\beta+\gamma)} = \dfrac{\tan \gamma}{\tan \beta}$

prove that $\sin 2\alpha + \sin 2\beta + \sin 2\gamma = 0$.

THURSDAY, 31ST OCTOBER.

[10 30 A.M. TO 1 30 P.M.]

PHYSICS.

N.B.—Write the answers to the two sections in separate books.

SECTION I

1. Define the units of force, velocity and acceleration. 15

How do you distinguish between uniform velocity and accelerated velocity? Under what conditions can acceleration be uniform?

A train is moving on straight level rails Explain how the work performed by the engine differs in the following cases —

(*a*) the rails nearly smooth and the velocity uniform ,

(*b*) the rails nearly smooth and the velocity uniformly accelerated ;

(*c*) the rails rough and the velocity uniform ;

(*d*) the rails rough and the velocity uniformly accelerated.

2 Explain the principle of hydrometers You are provided with an hydrometer which is meant to be used with liquids lighter than water and are asked to find the specific gravity of a solution of common salt in water. Can you use the hydrometer provided? If so, explain. 13

3. Define specific heat and explain how it is useful in finding the atomic weights of different elements. 10

Describe the dry and wet bulb hygrometer and explain how it is used to find the hygrometric state of the air.

4 Give the laws of vibrations of stretched strings. 12

In how many ways can a rod vibrate?

Mention some instruments in which these vibrations are produced.

A plate is sprinkled with sand and then made to vibrate. Explain what happens.

SECTION II.

5. Describe the total internal reflection of a ray of light in a transparent medium and explain what is meant by the critical angle. 14

A ray of light falls upon a prism whose refractive index is $\sqrt{2}$. The angle of incidence is 45° and the angle of the prism is 60°. Find the direction of the ray of light when leaving the prism.

6. A Leyden jar is discharged completely. Show that the heat produced by the discharge is proportional to $\frac{Q^2}{S}$ where Q = quantity of electricity in the jar and S = surface of the coating of the jar. 15

Two equal small spheres A and B are charged with electricity. The charge of A is + 24 units, that of B − 8 units. The distance between the centres of the spheres is 4 cms. Find the force with which they act upon one another. Then the spheres are allowed to touch after which the distance between them is again 4 cms. Find the force with which they now act upon each other.

7. Explain what is meant by the moment of a magnet and describe two methods by which the moments of two different magnets can be compared. 11

8. State and explain the laws of electric resistance. 1

When the poles of a battery whose internal resistance is equal to 2 units and whose E. M. F. is equal to 20 units are connected by a wire a current of 2 units passes through the wire. Find the resistance of the wire.

FRIDAY, 1ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

LOGIC.

N.B.—Answers to the two Sections should be written in separate books.

SECTION I.

1. Explain the definition of Logic given by Fowler and discuss the relation of Logic to Psychology and to language. Distinguish between a judgment and a proposition. 6

2. (*a*) Distinguish Abstract terms from Attributives and from Concrete terms. 1

(*b*) Explain:—"Singular terms are only mediately connotative."

(*c*) To what class do the terms constituting the following propositions belong:—

(1) Quickly is an adverb.

(2) The man of whom I was speaking this morning is as good as gold.

(3) These books can fill a large box.

(4) Arguing with a prejudiced person is like flogging a dead horse.

3. (*a*) Explain with the aid of illustrations :—"All negative propositions distribute their predicate, whereas affirmative propositions do not." Are there any exceptions to this rule ?

(*b*) State the following in Logical form and give their quantity and quality :—

(1) All those who preach social service are not self sacrificing.

(2) All your anxiety will not save him.

(3) There are many rich people in Bombay.

(4) They never pass their examination who are both dull and lazy.

4. (*a*) Show that all particular propositions must be *real*.

(*b*) State whether the following propositions are verbal or real and refer their predicates to the Heads of Predicables to which they belong —

(1) A dog has four legs and one tail.

(2) A triangle has three angles

(3) The men behaved foolishly.

(4) A noun is the name of a thing.

(5) Socrates was a philosopher.

5. (*a*) What is meant by Contradictory Opposition ? Explain why it is the only form of Opposition that can subsist between singular Propositions.

(*b*) Assuming that the following statement is incorrect, what propositions can be asserted as true :—

"Poets alone are men of genius."

(*c*) Criticise the following inferences, explaining the logical processes where they are correct, and pointing out the exact mistake where they are wrong :—

(1) Every poison can destroy life.
∴ Everything that cannot destroy life is non-poisonous.

(2) Every teacher has been a student.
∴ Every student has been a teacher.

(3 No unlucky person attains success in life.
∴ No person who has not been successful in life is lucky.

SECTION II.

6 Assuming that the following are valid arguments give their full logical expression :—

He will certainly not punish you, for he never fulfils his threats.

Only a clever man could succeed here, and he is not clever.

There must be a ship in sight, for the flag has been hoisted.

7. "In the First Figure the minor premise must be affirmative." Prove this, by the aid of a diagram or otherwise.

8. (*a*) State the following as a disjunctive syllogism — 8

It is hot here to day, for unless there is a wind it is always hot here, and there is no wind to-day.

(*b*) Express the following argument in the form of a dilemma, and rebut it —

In accepting a post under his control you are bound to have to endure some disadvantage, for in the hills the life is arduous, and in the plains the climate is trying.

9. (*a*) In a group of one hundred men who are looking for work, twenty have studied book-keeping, twenty speak French, and twenty have learned to use a type-writer. If we suppose these qualifications to be independent of one another, what is the probability, numerically stated, that any one of these men, selected at random, will possess them all? 7

(*b*) Explain in a few words the essential difference between corroborative evidence and the method of probable reasoning of which the above is an example.

10. Name the fallacies, if any, in the following arguments, explaining succinctly how they arise — 18

(*a*) A pack of wolves can easily kill a sambhar, therefore a wolf is a more formidable animal than a sambhar.

(*b*) You are fond of oranges, therefore this orange, though sour, will please you.

(*c*) All men who endure torture for the sake of their country must be men of high courage Regulus, the Roman consul, endured torture for the sake of Rome; therefore he must have been a man of high courage.

(*d*) You are wise, for you paid attention to the advice of your superiors, and wise men always do so.

(*e*) The insincerity of my opponent will be evident from the fact that with his characteristic want of candidness, and his usual false assumption of open-mindedness, he pretended to enter into the frank discussion of a subject on which he had already made up his mind.

IV.

EXAMINATION FOR THE DEGREE OF B.A.

EXAMINERS.

A. B. CLARKE, B.A.	In English.
H. G. RAWLINSON, M.A.	
H. M. BHADKAMKAR, B.A.	In Sanskrit.
B. R. ARTE, M.A.	
The Rev. A. AILINGER, S.J.	In Latin.
N. S. TAKAKHAV, M.A.	
JEHANGIR E. DAVAR, O.I.P.	In French.
LOUIS PELTIER, B.A., B.Sc., O.I.P. ...	
B. T. ANKLESARIA, M.A.	In Avesta and Pahlavi.
D. M. MADAN, M.A., LL.B.	
J. S. GAMBHIR, B.A.	In Persian.
M. AHMED, M.A.	
P. A. WADIA, M.A.	In History and Political Economy.
S. H. HODIVALA, M.A.	
The Rev. A. VAETH, S.J.	
S. L. JOSHI, M.A.	
The Rev. J. R. CUTHBERT, M.A.	In Logic and Moral Philosophy.
V. A. SUKHTANKAR, PH.D.	
R. P. PARANJPYE, B.Sc., M.A.... ...	In Mathematics.
JOHN MACLEAN, M.A., B.Sc....	
CHAS. J. J. FOX, B.Sc., PH.D.	In Chemistry.
N. A. MASANI, M.A., B.Sc.	
K. R. KANITKAR, M.A., B.Sc.	In Physics.
The Rev. A. STEICHEN, S.J.	
V. N. HATE, B.Sc.	In Botany.
J. P. MULLAN, M.A.	
A. M. MASANI, M.A., B.Sc.	In Zoology.
The Rev. J. ASSMUTH, S.J.	

MONDAY, 18TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

ENGLISH (*Text Books*).

BACON—*Advancement of Learning, Book I and Book II* (i—xiv).
SHAKESPEARE—*I Henry IV and Macbeth.*

N. B.—The answers to the two sections are to be written in separate books.

SECTION I.

Henry IV, Part I; Macbeth.

1. Paraphrase the following passages, supplying their contexts:— 20

(*a*) Was the hope drunk
Wherein you dressed yourself? hath it slept since?
And wakes it now, to look so green and pale
At what it did so freely? From this time
Such I account thy love. Art thou afeard
To be the same in thine own act and valour
As thou art in desire? Wouldst thou have that
Which thou esteemest the ornament of life;
And live a coward in thine own esteem,
Letting 'I dare not' wait upon 'I would,'
Like the poor cat i' the adage?

(b) For thou hast thy princely privilege
With vile participation: not an eye
But is a-weary of thy common sight,
Save mine, which hath desir'd to see thee more!
Which now doth that I would not have it do,—
Make blind itself with foolish tenderness.

2. Annotate the following passages:— 15

(a) An I have not ballads made on you all, let a cup of sack be my poison.

(b) . . . . . . to trust so rich a main
On the nice hazard of one doubtful hour.

(c) Most sacrilegious murder hath broke ope
The Lord's anointed temple, and stole thence
The life o' the building

(d) Opinion, that did help me to the crown,
Had still kept loyal to possession,
And left me in reputeless banishment.

(e) . . . . for their dear causes
Would to the bleeding and the grim alarm
Excite the mortified man.

3. What, briefly, are the arguments for and against the theory that parts of Macbeth were not written by Shakespeare? 10

4 Compare the attitudes adopted by Macbeth and Lady Macbeth towards the murder of Duncan. 15

5. 'The main source, then, of our sympathetic delight in Falstaff is his humorous superiority to everything serious, and ' the freedom of soul enjoyed in it; (*Bradley*). Comment on this remark. 15

SECTION II.

Bacon.

6. "Bacon was the person who first turned the minds of speculative men, long occupied in verbal disputes, to the discovery of new and useful truth." (*Macaulay.*) 15

Explain and discuss this statement.

7. Explain with reference to the context:— 20

(a) Knowledge is but remembrance.

(b) We that know by divine revelation that not only the understanding but the affections purified, not only the spirit but the body changed, shall be advanced to immortality, do disclaim in these rudiments of the senses.

(c) Metaphysic handles that which supposeth further in nature a reason, understanding, and platform.

(d) Imagination ever precedeth voluntary motion.

(e) In all inductions, whether in good or vicious form, the same action of the mind which inventeth, judgeth; all one as in the sense.

8. Explain *very briefly* the following technical terms in Bacon:— 10

Cosmography, Euthanasia, Middle Proposition, Topic, Elenche.

9. "No poet could have written Bacon's analysis of the Art of Poetry." In what respect is Bacon's treatment of the subject deficient? 15

10. Why does Bacon lay so much stress on Inductive Reasoning, and why does he condemn, and with what justice, the inductive methods of his predecessors? 15

SATURDAY, 23RD NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

ENGLISH (*Composition*).

Write an Essay on *one* of the following subjects *only* —

1. " Arts which flourish in times while virtue is in growth, are military: and while virtue is in state, are liberal: and while virtue is in decline, are voluptuary." (*Bacon*)

2. The best Education is that which fits a man best for the duties of life.

SATURDAY, 23RD NOVEMBER.
[2 30 P.M. TO 5-30 P.M.]

SANSKRIT (*Compulsory*).

Sâhityadarpaṇa I, II. X. and Kâdambarî (*Part*).

N.B.—The answers to the two sections should be given in separate books.

SECTION I.

1. Translate into English the following passages, give context, explain the ideas in them, and state with reasons whether or not विश्वनाथ accepts them :— 14

(*a*) अर्थः सहृदयश्लाघ्यः काव्यात्मा यो व्यवस्थितः ।
वाच्यप्रतीयमानाख्यौ तस्य भेदावुभौ स्मृतौ ॥

(*b*) स्वरोऽपि काक्वादिरूपः काव्ये विशेषप्रतीतिकृदेव । उदात्तादिरूपोऽपि मुनेः पाठोक्तदिशा शृङ्गारादिरसविशेषप्रतीतिकृदेवेत्येतद्विषये उदाहरणमुचितमेव ।

(*c*) इह केचिदाहुः ‘वाच्यवाचकरूपालंकरणमुखेन रसाद्युपकारका एवालंकाराः । रसादयस्तु वाच्यवाचकाभ्यामुपकार्या एवेति न तेषामलंकारता भवितुं युक्ता’ इति । अन्ये तु ‘रसाद्युपकारमात्रेणेहालंकृतिव्यपदेशो भाक्तश्चिरंतनप्रसिद्ध्याङ्गीकार्य एव’ इति । अपरे च ‘रसाद्युपकारमात्रेणालंकारत्वं मुख्यतः, रूपकादौ तु वाच्याद्युपधानमजागलस्तनन्यायेन’ इति । अभियुक्तास्तु ‘स्वव्यञ्जक-

वाच्यवाचकाद्युपकृतैरङ्गभूतै रसादिभिरङ्गिनो रसादेर्वाच्यवाचकोपस्कारद्वारेणोपकुर्वद्भिरलंकृतिव्यपदेशो लभ्यते । समासोक्तौ तु नायिकादिव्यवहारमात्रस्यैवालंकृतता नत्वास्वादस्य तस्योक्तरीतिविरहात् ' इति मन्यन्ते ।

2. (*a*) Give the *Sanskrit* definitions of any *four* of the following with their explanations and illustrations :— 16

योग्यता, एकदेशविवर्तिरूपक, उल्लेख, परिकर, हेतु, विध्याभ्यास, विकल्प, समाधि, व्याजोक्ति.

(*b*) Under which of the divisions and sub-divisions of लक्षणा, as given by विश्वनाथ, will you class विपरीतलक्षणा? Give reasons. Give an example of it, and state the requisites of लक्षणा in its case.

(*c*) What is the scope of औपम्यगर्भत्वेन विशेषणसाम्यात् समासोक्ति according to विश्वनाथ and according to some others? Give reasons for the difference of views if any.

3. Compare and contrast :— 10

(*a*) लक्षणा and व्यञ्जना ;

Or

व्यङ्ग्योत्प्रेक्षा and प्रतीयमानोत्प्रेक्षा ;

(*b*) संदेह, उत्प्रेक्षा, and अतिशयोक्ति ;

(*c*) प्रतिवस्तूपमा, वाक्यार्थनिदर्शना, दृष्टान्त and अर्थान्तरन्यास.

4. Translate into English any *two* of the following :— 10

(*a*) हे हे मण्डनमार्ग मार्गविटपिञ्जीव्याः समाः शाश्वती-
र्व्याप्यावृणु दिक्तटानि विटपैः सालैश्चुम्बाम्बरम् ।
मूले विश्रमणाशयैव लुठिता यत्र त्वया केवलं
घर्मार्तैः परिमोचिताः फलशतैर्यावद्वयं तर्पिताः ॥

(*b*) द्रव्याणामवरोत्तरव्यतिकरो भग्नाशयानामधो
बीजानां नयनं स्वयं च निजवाञ्छिद्रक्रियान्वेषणम् ।
व्यूहाबन्धविधायिभिर्गतभयैर्मुग्धप्रसुतार्भकं
शून्यं प्राप्य निवासमाखुभिरहो किं किं न यद्यत्कृतम् ॥

(c) अन्योन्यस्य लग्नं भयादिव महाभूतेषु यातेष्वकं
कल्पान्ते परमेक एव स तरुः स्कन्धोच्चयैर्जृम्भते ।
बिन्दस्य त्रिजगन्ति कुक्षिकुहरे देवेन यस्यास्यते,
शाखाग्रे शिशुनेव सेवितजलक्रीडाविलासाक्रमम् ॥

SECTION II.

5. Translate accurately into English :— 10

क्रमेण चोद्गते गगनमहाम्भोधिपुलिने सततलोकनिद्रामङ्गलकलशे कुमुदबान्धवे विघटितकुमुदवने धवलितदशदिशि शङ्खश्वेते श्वेतिमानमातन्वति शशाङ्कमण्डले शशिकरकलापक्षालितासु व्रजन्तीषु काशिमानमौडवीषु प्रभासु प्रस्रवत्सु च कैलासशशिमणिशिलानां सर्वतः स्रोतःस्राविषु प्रस्रवणेषु मृणालकन्दलिनि चावस्कन्दपातितचन्द्रकर इव विलुप्तकमलवनशोभे भात्यच्छोदसरःपयसि समुपोढमोहनिद्रे च द्राघीयोवीचिविचलितवपुषि विरुवति विरहिणि चक्रवाकचक्रवाले निर्वृत्ते च चन्द्रोदये चन्द्रापीडः सुतामालोक्य महाश्वेतां पल्लवशयने शनैः शनैः समुपाविशत् ।

6. Explain the following, giving the context :— 10

(a) दाशरथिबलैरिवाञ्जननीलनलपरिगतप्रान्तैर्भवनतालसैरिव संनिहितवेत्रासनैर्महासमरभुवैरिव पुंनागसमाकृष्टशिलीमुखैरारब्धपञ्जरपःक्रियैरिवोच्छिखशिखिमण्डलपरिगतैः ......

(b) पृथिवीमिव समुत्सारितमहाकुलभूभृद्व्यतिकरां शेषभोगेषु निषण्णां दिनमुखलक्ष्मीमिव भास्वन्मुक्तांशुभिन्नपद्मरागप्रसाधनां मयूरावलीमिव नितम्बचुम्बिशिखण्डभारविस्फुरच्चन्द्रकान्ताम् ......

7. (a) What inferences can you draw, from your portion of *Kâdambarî*, as regards the state of religious belief at the time of *Bâṇa*? Support your answers by quotations from, or references to, your text. 15

(b) Describe in English the idol of *Chaṇḍikâ* and its surroundings according to *Bâṇa's* description of the scene.

8. Translate into Sanskrit :— 15

The greatest ornament of the literary circle at *Harsha's* court was the Brâhmana *Bâṇa*, author of the historical romance devoted to a panegyrical account of the deeds of his patron, which is an amazingly clever, but irritating, performance, executed in the worst possible taste, and yet containing passages of admirable and vivid description. The man, who attributes to the commander-in-chief, Skandagupta, 'a nose as long as his sovereign's pedigree', may fairly be accused of having perpetrated the most grotesque simile in all literature. But the same man could do better, and shows no lack of power when depicting the death-agony of the king.

SATURDAY, 23RD NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LATIN (*Compulsory*).

N.B.—The answers to the two sections should be written in separate books.

HARACE—*Satires*; CICERO—*De Oratore, B. I.*

SECTION I.

1. Translate into English :— 20

(*a*) Tantalus a labris sitiens fugientia captat
Flumina. Quid rides? mutato de te
Fabula narratur: congestis undique saccis
Indormis inhians, et tanquam parcere sacris
Cogeris, aut pictis tamquam gaudere tabellis.

Explain the train of ideas in this passage.

(*b*) Fuerit Lucilius, inquam,
Comis et urbanus; fuerit limatior idem,
Quam rudis et Graecis intacti carminis auctor,
Quamque poetarum seniorum turba: sed ille,
Si foret hoc nostrum fato delatus in aevum,
Detereret sibi multa, recideret omne, quod ultra
Perfectum traheretur.

Explain "*Graecis . . . . auctor.*"

(*c*) Rancidum aprum antiqui laudabant, non quia nasus
Illis nullus erat, sed, credo, hac mente, quod hospes
Tardius adveniens vitiatum commodius, quam
Integrum edax dominus consumeret. Hos utinam inter
Heroas natum tellus me prima tulisset!

2. Translate and explain :— 12

(1) Furum aviumque maxima formido.

(2) Nescio an Anticyram ratio illis destinet omnem.

(3) Quae Crispini docuit me ianitor, edo.

(4) Credat Iudaeus Apella; faba Pythagorae cognata; Ianus medius.

3. How did the Stoics arrive at the paradox contained in— 6

"Insanis et tu stultique prope omnes."?

4. Translate into English :— 14

Proelio ad Hydaspem commisso, Alexander, rex Macedonum, Porum interemptum esse ratus, corpus eius spoliari iussit; et qui detraherent loricam vestemque concurrebant, cum elephas dominum tueri et spoliantes coepit appetere levatumque corpus eius rursus dorso suo imponere. Ergo telis undique obruitur; confossoque eo Porus in vehiculum impositus ad regem advectus est. Quem rex ut vidit, non odio sed miseratione commotus, "Quae, malum," inquit, "amentia te coëgit, rerum mearum cognita fama, belli fortunam experiri?" At ille, "Quoniam," inquit, "percontaris, respondebo ea libertate quam interrogando fecisti. Neminem me fortiorem esse censebam: fortiorem esse te belli docuit eventus. Sed ne sic quidem parum felix sum secundus tibi."

SECTION II.

5. Translate:— 18

(1) Aliud mihi quoddam orationis genus esse videtur eorum hominum, de quibus paulo ante dixisti: nitidum quoddam genus est verborum, et palaestrae magis et olei quam huius civilis turbae ac fori. Namque egomet, cum pro consule in Ciliciam proficiscens venissem Athenas, complures tum ibi dies sum commoratus; sed cum cotidie mecum haberem homines doctissimos, cum hoc nescio quo modo inter eos increbruisset me in causis maioribus sicuti te solere versari, pro se quisque ut poterat de officio et de ratione oratoris disputabat.

(2) "Exercitatio quaedam suscipienda vobis est; quamquam vos quidem iam pridem estis in cursu; sed eis, qui ingrediuntur in stadium quique ea, quae agenda sunt in foro tamquam in acie, possunt etiam nunc exercitatione quasi ludicra praediscere ac meditari." "Hanc ipsam," inquit Sulpicius, "nosse volumus; ac tamen ista, quae abs te breviter de arte decursa sunt, audire cupimus; verum illa mox; nunc de ipsa exercitatione quid sentias quaerimus."

(3) Si nos, id quod maxime debet, nostra patria delectat, cuius rei tanta est vis ac tanta natura, ut Ithacam illam in asperrimis saxulis tamquam nidulum adfixam sapientissimus vir immortalitati anteponeret, quo amore tandem inflammati esse debemus in eius modi patriam, quae una in omnibus terris domus est virtutis, imperi, dignitatis? Cuius primum nobis mens, mos, disciplina nota esse debet, vel quia est patria parens omnium nostrum vel quia tanta sapientia fuisse in iure constituendo putanda est, quanta fuit in his tantis opibus comparandis.

6. Explain fully the meaning of the following passages:— 12

(1) Ti. et C. Semproniorum pater, homo prudens et gravis, haud unquam eloquens, saluti rei publicae fuit; at vero eius filii diserti et omnibus vel naturae vel doctrinae praesidiis ad dicendum parati, cum civitatem vel paterno consilio vel avitis armis florentissimam accepissent, ista praeclara gubernatrice, ut ais, civitatum eloquentia rem publicam dissipaverunt.

(2) Quia de oratore quaerimus, fingendus est nobis oratione nostra detractis omnibus vitiis orator atque omni laude cumulatus. Neque enim, si multitudo litium, si varietas causarum, si haec turba ac barbaria forensis dat locum vel vitiosissimis oratoribus, idcirco nos hoc quod quaerimus omittemus.

(3) Illa deridenda adrogantia est in minoribus navigiis rudem esse confiteri, quinqueremes aut etiam maiores gubernare didicisse. Tu mihi cum in circulo decipiare adversarii stipulatiuncula, ego tibi ullam causam maiorem committendam putem? Citius is, qui duorum scalmorum naviculam in portu everterit, in Euxino ponto Argonautarum navem gubernarit.

7. What are the views about eloquence put forward by Crassus and Antonius in *De Oratore I*? Which of the two spokesmen expresses the views of Cicero himself?

8. Translate:— 1

In the year 57 B.C. Cicero returned from exile. The warmth of his reception, alike in the provincial towns and in the capital, can hardly have concealed from him the fact that his political significance was gone. The oligarchs had been willing enough to use him as their tool in suppressing the conspiracy of Catiline by means of more than doubtful legality. But they had shown too plainly how little they were disposed to incur any peril by defending him.

SATURDAY, 23RD NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

FRENCH (*Compulsory*).

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

RACINE—*Iphigenie.*

1. Translate into English :— 12

(*a*) Déjà plus d'une fois dans vos plaintes forcées
J'ai dû voir et j'ai vu le fond de vos pensées.
Mais toujours sur mes yeux ma facile bonte
A remis le bandeau que j'avois écarté.
Vous l'aimez. Que faisois je ? et quelle erreur fatale
M'a fait entre mes bras recevoir ma rivale ?
Crédule, je l'aimois Mon cœur même aujourd'hui
De son parjure amant lui promettoit l'appui.
Voilà donc le triomphe ou j'étois amenee.
Moi même à votre char je me suis enchaînée.
Je vous pardonne, helas ! des vœux intéressés,
Et la perte d'un cœur que vous me ravissez.
Mais que sans m'avertir du piège qu'on me dresse,
Vous me laissiez chercher jusqu'au fond de la Grèce
L'ingrat qui ne m'attend que pour m'abandonner,
Perfide, cet affront se peut-il pardonner ?

(*b*) O monstre, que Megère en ses flancs a porté !
Monstre, que dans nos bras les enfers ont jete !
Quoi ? tu ne mourras point ? Quoi ? pour punir son crime. . .
Mais ou va ma douleur chercher une victime ?
Quoi ? pour noyer les Grecs et leurs mille vaisseaux,
Mer, tu n'ouvriras pas des abîmes nouveaux ?
Quoi ? lorsque les chassant du port qui les recele,
L'Aulide aura vomi leur flotte criminelle,
Les vents, les mêmes vents, si longtemps accusés,
Ne te couvriront pas de ses vaisseaux brises ?
Et toi, soleil, et toi qui dans cette contrée
Reconnois l'héritier et le vrai fils d'Atrée,
Toi, qui n'osas du père eclairer le festin
Recule, ils t'ont appris ce funeste chemin.

2. (1) Translate and fully explain with reference to the context :— 9

(*a*) Ma mort n'emporte pas tout le fruit de vos feux :
De l'amour qui vous joint vous avez d'autres nœuds ;
Vos yeux me reverront dans Oreste mon frère.
Puisse-t-il être, hélas ! moins funeste à sa mere !

(*b*) Jamais vaisseaux partis des rives du Scamandre
Aux champs thessaliens osèrent-ils descendre ?
Et jamais dans Larisse un lâche ravisseur
Me vint-il enlever ou ma femme ou ma sœur ?

(*c*) Les Dieux vont s'apaiser. Du moins Calchas publie
Qu'avec eux, dans une heure, il nous réconcilie,
Que Neptune et les vents, prêts à nous exaucer,
N'attendent que le sang que sa main va verser.

(2) What is the gender of the word *amour* ?

In what gender does Racine use the word ?

Illustrate your answer by quotations from the text.

3. Answer in English one of the following questions:—

(*a*) Analyse Act IV—Scene IV, in which scene Clytemnestre shows the unhappy monarch that his design is discovered, etc

(*b*) What important part is Eriphile made to play in the tragedy?

4. Ne traitez que l'une des questions suivantes:— 17

(*a*) Écrire à quelque ami une lettre pour lui recommander la lecture d'Iphigénie en disant pourquoi cet ouvrage est recommande par vous.

(*b*) On a blâmé Racine "d'avoir peint sous des noms anciens des courtisans de Louis XIV".

Le reproche est-il juste? Motivez votre réponse.

(*c*) Étudier l'amour maternel dans le personnage de Clytemnestre.

5. Translate into French:— 7

About the same time that *Iphigénie* was produced on the stage, Racine was admitted into the French Academy. Fléchier, the celebrated preacher and orator, was also admitted on the same day. In the discourse which it has been always customary for each new member to make after his reception, the churchman pleased all his hearers by his manner and by his power of eloquence; but Racine disappointed everybody. This was the more remarkable, because it was well known that he read his own pieces with perfect effect, and that he took great pains—which, as a rule, were successful—to teach the actors how to recite his set speeches and his long soliloquies. We have no means of judging what he said when he took his place in the Academy, as his harangue has not been preserved.

SECTION II.

THAMIN—*Extraits des Moralistes.*

6. Translate into English:— 10

(*a*) Bénie soit l'enfance qui met un peu de ciel entre les rudesses terrestres. Ces quatre-vingt mille naissances quotidiennes, dont parle la statistique, sont une sorte d'effusion d'innocence et de fraîcheur qui lutte non-seulement contre la mort de l'espece, mais contre la corruption humaine et la gangrène universelle du peché. Ce qu'il se fait de bons sentiments autour des berceaux et de l'enfance est un des secrets de la Providence générale; supprimez cette rosee rafraîchissante, et la mêlée des passions egoistes desséchera comme le feu la société humaine . . . Bénie soit l'enfance pour le bien qu'elle fait et pour le bien qu'elle occasionne, sans le savoir et sans le vouloir, en se faisant aimer, en se laissant aimer. Le peu de paradis que nous apercevons encore sur la terre est dû à sa présence.

(*b*) Quoique tout être sensible naisse essentiellement animal d'habitude, il y a des ames qui se developpent avec une certaine raideur, une fixite, une inflexibilite qui ferait penser qu'elles ont eté plus fortement trempees que les autres. De là vient que le caractère est souvent nommé *complexion* et *temperament*. Tantôt le caractère est le fruit d'une passion dominante, tantôt de certains principes qu'on s'est faits et tantôt de quelque puissant préjuge qu'on a reçu. Dans tous ces cas, l'homme à caractère impose également à ses propres passions et aux passions des autres; et non-seulement l'individu à grand caractère résiste à cette double tyrannie, mais il finit souvent par établir la sienne. Les caractères sont rares chez les peuples polis et communicatifs.

7 Discutez en français ces paroles de Michelet: "L'homme naît noble et il meurt noble; il faut tout le travail de la vie pour devenir grossier, ignoble, pour créer l'inégalité."

8. Which one or which ones of the moralists you studied do you prefer, and why? 1

9. Translate into French :— M

Detach your soul from all that you love except God : such is, in a very few words, the science of death.

For those who see death in all its brutality, what consolation, what encouragement have you at the critical moment? What will you tell them on the border of annihilation?—Nothing more than the precepts of ancient stoicism : three very simple and somewhat harsh words : "Be not cowardly."

Cliton never had but two occupations in his whole life, that is to have dinner in the morning and supper at night : he seems to have been born only for digesting.

There is no lack of people who believe they are modest and believe it with good faith ; they even appear to be so if one looks only on the surface of it. But examine them somewhat closely.

SATURDAY, 23rd NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

AVESTA AND PAHLAVI (*Compulsory*)

AVESTA—(*a*) Yasna XXVIII—XXXI.

(*b*) Vendidâd, VII.

PAHLAVI—(*a*) Dâdistân-î- Dînîk, Questions I—XIII

(*b*) Vendidâd, VII.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1 Translate into English, with grammatical and explanatory notes, where necessary :— 25

(*a*) [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

(b) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(c) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(a) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(e) [illegible]

(f) [illegible]

(*g*) [illegible]

2. Annotate :— 10

(*a*) [illegible]

(*b*) [illegible]

(*c*) [illegible]

(*d*) [illegible]

(*e*) [illegible]

(*f*) [illegible]

(*g*) [illegible]

(*h*) [illegible]

(*i*) [illegible]

(*j*) [illegible]

3. Give a literary and critical estimate of the *Tâ-vê-urvâta* hymn (Yasna 31). Determine, from intrinsic evidence, at what stage in Zarathustra's public mission it could have been written. 5

4. (*a*) Discuss comparatively the literary and historic value of the *Gâthâ* hymns and the *Vendîdâd*. 10

(*b*) Discuss, from the intrinsic evidence of the *Vendîdâd*, how far the art of healing had attained perfection in ancient Irân.

SECTION II.

5. Translate into English :— 15

(*a*) [illegible]

(b) [illegible]

(c) [illegible]

6. Annotate fully the following:—

[illegible]

7. As a result of your study of the first thirteen chapters of the Dâtastân î-Dînîk, give a critical estimate of the merits of the author as a teacher of philosophy and morals.

8. Translate into Avesta:—

We praise the brilliant deeds of purity in which the souls of the dead rejoice, and which are the Fravashis of the pious. The Fravashi of a pious man, in the shape of a beautiful damsel, thus cheers him when dead, at the Chinvat bridge. "O holy man who hast come near unto the world of spirit from that which is the material world, I am the good thought which thou didst think, the good word which thou didst utter, the good deed that thou didst perform. Verily, am I thy conscience."

9. Translate into Pahlavi:—

I, Vishtasp, King of Persia, King of Kings, do hereby make this my last will: "Unto the people of Persia. It is my advice and my strong enjoinment to you all to maintain in purity the good Mazdayasnian religion which the greatest prophet Zarathushtra has brough into this world, and which I accepted. Reckon it your duty to sprea the belief in that religion in this world. May the knowledge, propagation and belief in the holy religion be over the seven regions of th earth! May it be so! May it be the more so!"

EXAMINATION FOR THE DEGREE OF B.A., 1912.

SATURDAY, 23RD NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PERSIAN (*Compulsory*).

SECTION I.

1 Translate into English:—

(a)
صباح عید که در تکیه گاه ناز و نعیم
گدا کلاه نمد کج نهاد و شه دیهیم
بساط مجلس دهر آنچنان نشاط انگیز
که دست را بسماع آستین دهد تعلیم
نشاط طبع بحدی که نشنود دانا
بجز ترانه اطفال و ترهات ندیم
نوای مرثیه صوم و شادیانه عید
کشاده از اثر انبساط گوش صمیم
بخوان مائده شد دست اشتها مطلق
بکام و معده عداوت فزود طبع لئیم

(b)
منادی است زهر سو که ای خواص و عوام
می نشاط حلال و شراب غصه حرام
فضای عالم هستی بعرصه تنگ آمد
مشابه دل عاشق مثال چشم لئام
هوای روضهٔ گیتی شگفته شد ز انسان
که نو بهار خط گلرخان سیم اندام
قضا نهاده بکام زمانه معجونی
که بهر ساختن آن قدر گرفته بوام
بشاشت دل اطفال در شب نوروز
نشاط خاطر صائم بصبح عید تمام

(c) اما شاعر باید که سلیم الفطرة عظیم الفکرة
صحیح الطبع جید الرویه دقیق النظر باشد در انواع
علوم متنوّع باشد و در اطراف رسوم مستطرف زیراکه
چنانکه شعر در هر علمی بکار آید هر علمی در شعر
بکار همی شود و شاعر باید که در مجلس محاورت
خوشگوی بود و در مجلس معاشرت خوشروی و
باید که شعر او بدان درجه رسیده باشد که در
صحیفهٔ روزگار مسطور باشد و بر السنهٔ احرار مقروء

(d) غایت فصاحت قرآن ایجاز لفظ و اعجاز معنی است
و هرچه فصحا و بلغا را امثال این تضمین افتاده
است تا بدرجه ایست که دهشت همی آرد و
عاقل و بالغ از حال خویش همی بگردد و آن دلیلی
واضح است و حجتی قاطع بر آنکه این کلام از
مجاری نفس هیچ مخلوق نرفته است و از هیچ کام
و زبانی حادث نه شده است و رقم قدم بر ناصیه
اشارات و عبارات او مثبت است

2 Write notes on :— 10

هیولا - جهل مرکب - مآثر باحور - دورباش -
ارژنگ - نسناس - اعتزال - علم هیأت - کدخدا
و هیلاج - امام ثقلین

3. Explain clearly the ideas conveyed in the following lines, noting the allusions :— 10

(a) کوس افلاطونی از یونان زمین
میبرم در ملک گیلان میزنم

(b) من و سلوی بر سرم ریزند و من
بر دل صدپاره دندان میزنم

(c) میان انوری و عرفی ار جوید کسی نسبت
حدیث ماه نخشب عرضه دار و ماه تابانش

(d) نه اطلس فلک نشود عطف دامنت
بر قد کبریای تو دوزند اگر لباس

(e) گر شاه دوشش خواست دو یک زخم افتاد
تا ظن نبری که کعبتین داد نداد
آن زخم که کرد رای شاهنشه یاد
در خدمت شاه روی بر خاک نهاد

4. Give the substance (in English or Persian) of the description given by Urfi of any *one* of the following subjects :— 5

فصل بهار - ستایش خود - شکایت روزکار

SECTION II.

5. State what you know about :— 10

برامکه - باربد - صاحب عباد - سلطان سنجر — خاقانی

6. Give an account of the most trustworthy particulars regarding the life of the author of the Chehar Maqala, mentioning some of the historical and chronological errors concerning the names and dates of well-known persons and occurrences referred to in the book. 10

7. What do you know of the princes of Ghur, under whose patronage the author of the Chehar Maqala flourished? 10

8. Give, in Persian, the remarks of Nizami Aruzi on the nature of the science and art of medicine and the qualifications of an expert physician. 20

Or

Translate into Persian :—

The Amir turned his face to the ambassador and said, "Go, tell the Caliph that I am the son of a coppersmith and learned from my father the coppersmith's craft. My food has been barley bread, fish and onions. This dominion and treasure and goods I own by cunning and courage; I neither inherited them from my father nor received them from thee. I will not rest until I destroy thy House: I will either do this which I say or I will return to my barley bread and onions. Behold, I have opened the doors of my treasure-houses and have called out my troops, and I come on the heels of this message."

TUESDAY, 19TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

HISTORY OF ENGLAND.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

Only *six* questions are to be attempted in this section.

Equal marks are assigned to each question.

1. Examine the relations between Charles II and his Parliaments. What were the causes of the continual struggle between the two powers ?

2 Outline the distinctive principles of the earlier Whigs and Tories. How far was the attitude of the latter at the time of the Revolution at variance with their principles ?

3 Sketch the career of Bolingbroke and estimate the influence of his political writings.

4. What were the causes and favourable circumstances that led to the rise and early growth of the Cabinet system ?

5. Review and discuss Walpole's financial administration.

6. Give an account of the part played by England in the Seven Years' War. To what extent was the success achieved the work of Pitt ?

7. Trace the causes of the American War of Independence.

8. How far were the conditions of England at the end of the 18th century favourable to the spread of revolutionary principles ? Why did the example of the French Revolution ultimately produce so little effect in England ?

SECTION II.

Only two questions to be attempted in this section.
Equal marks are assigned to each question.

9. Describe the circumstances that led to the union between England and Ireland. What part did Pitt play therein ?

10. Give an account of the efforts made at different times in the reign of George III to secure the abolition of the slave trade.

11. Describe the circumstances in which the Duke of Wellintgon became Prime Minister. Give an account of his Ministry.

WEDNESDAY, 20TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

HISTORY OF INDIA.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

N.B.—Four questions only to be attempted in this section.

Equal marks are assigned to each question.

1. Sketch the political condition of India at the time of Hoomayoon's death, and narrate the principal events that occurred between Akbar's accession to the throne and the assassination of Beiram Khan.

2. Describe the character and extent of Portuguese power in the East under Albuquerque and account for its subsequent decline.

3. Give an account of Aurangzebe's campaigns in the Deccan and examine the causes of his failure.

4. Sketch the commercial and political history of the East India Company from its foundation to 1748.

5. The period between 1760 and 1765 in Bengal has been called "the reign of misrule". Illustrate this statement, and give a critical account of Clive's second administration.

SECTION II.

N.B.—Only four questions to be attempted in this section.
Equal marks are assigned to each question.

6. How far was the war declared by Wellesley and his allies against Tippu justifiable? Give your opinion of the manner in which Tippu's territories were partitioned.

7. Explain fully the following statement:—

> "The Treaty of Bassein was a virtual surrender of the Peshwa's independence: but it arose out of a position into which his own intrigues had driven him."

8. What were the circumstances that led to the abandonment of the policy of non-intervention during the administration of Lord Hastings?

9. Form a critical estimate of Lord William Bentinck as reformer and statesman.

10. Give a sketch of the events that led to the two wars with the Sikhs.

THURSDAY, 21ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

POLITICAL ECONOMY.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

N.B.—Not more than six questions in this section should be attempted.
Equal marks are assigned to each question.

1. Give clear and critical expositions of the various theories as to the cause of value.

2. "Capital is created by saving." Explain and criticise the statement.

3. State the arguments for and against Say's Law of Markets or the possibility of a general glut.

4. "The continued depreciation of the monetary standard is a phenomenon of great social importance the effects of which must be recognised as beneficial." Explain, illustrate and criticise the statement.

5. Indicate clearly the distinction between the old theory of the Balance of Trade and the modern doctrine of the Balance of Accounts, and show how the equilibrium of the latter is generally maintained whenever disturbed.

6. Point out the real nature of the services rendered by credit to Production and refute the theory which identifies credit with capital.

7. Expound and criticise Lassalle's Theory of the Iron Law of Wages *or* the Residual Claimant Theory favoured by Walker.

8. Discuss the old arguments against the legitimacy of interest and the theories which have been put forward to account for interest in our own times.

SECTION II.

N.B.—Not more than two questions in this section should be attempted.

9. What are the leading doctrines of the French Physiocrats? Who were the chief writers of the school and how far did Adam Smith agree with them?

10. Discuss the following statement:—

"What has been ambitiously called the Malthusian theory of population instead of being a great discovery or a poisonous novelty is no more than a formal enunciation of obvious, though sometimes neglected, facts."

11. Discuss Ricardo's theory of Rent.

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ENGLISH (*Voluntary*)—PAPER I.

Elizabethan Period (1579—1625).

N.B.—*Nine* questions *only* are to be answered, the first question being compulsory.

1. Identify and explain *very briefly* the following quotations with reference to their context — 20

(*a*) Was this the face that launched a thousand ships
And burnt the topless towers of Ilium?

(*b*) But the imperial votaress passed on
In maiden meditation, fancy-free.

(*c*) Tell Isabel the queen I looked not thus,
When for her sake I ran at tilt in France,
And there unhorsed the Duke of Claremont.

(*d*) Bare ruined choirs, where late the sweet birds sang.

(*e*) Drink to me only with thine eyes
And I will pledge with mine.

(*f*) Hunting by the brook,
I found him sitting by a fountain's side,
Of which he borrowed some to quench his thirst,
And paid the nymph as much again in tears.

(*g*) Those bricky towers,
Where now the studious lawyers have their bowers,
There whilome wont the Templar-Knights to bide,
Till they decayed through pride.

(*h*) There's rosemary, that's for remembrance; pray, love, remember; and there is pansies, that's for thoughts.

(*i*) I never heard the old song of Percy and Douglas, that I found not my heart moved more than with a trumpet.

(*k*) "What is Truth?" said jesting Pilate, and would not stay for an answer.

2. Estimate the influence of Classical and Italian Literature respectively upon the development of English Literature in the Elizabethan period. 1

3. What part was played by Greene and Marlowe in the development of the English drama, and what traces of their influence may be observed in the earlier plays of Shakespeare? 1

4. From the plays you have studied, what do you gather as to Shakespeare's conception of the Ideal Man? 1

5. What do we learn from Elizabethan Literature about the stage, the actors, and the drama generally, in this period? 1

6. Compare *Volpone* with any of Shakespeare's comedies, so as to bring out the essential differences between the two dramatists. 1

7. How far is it true to say that the decadence of the Elizabethan Drama begins with Beaumont and Fletcher? Illustrate from *Philaster* the good and bad points of their work. 1

8. Estimate the value of Sir Philip Sidney as a critic. 1

9. What light is thrown upon the character, tastes, and opinions of Bacon by his *Essays*? 1

10. Estimate the importance, literary and otherwise, of the Authorized Version of the English Bible. 1

11. Give a short account of the English Novel in the Elizabethan Age. 1

12. Mention some of the characteristic merits of Elizabethan lyric poetry, with illustrative quotations. 1

13. Give an account of the chief translations, prose and verse, made in this period, with some estimate of their literary importance. 1

14. Write a short criticism of *one* work from *each* of the following groups:— 1

(*a*) *Hero and Leander*; *The Broken Heart*; *The Knight of the Burning Pestle*; *Every Man in his Humour*.

(*b*) *Arcadia*; *Discoveries*; *Purchas his Pilgrimage*; *The Anatomy of Melancholy*.

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ENGLISH (*Voluntary*)—PAPER II.

SPENSER—Faerie Queene, Book 1.

1. Give full explanatory notes on the following passages:—

(*a*) By this the Northern waggoner had set
His sevenfold team behind the stedfast starre
That was in Ocean waves yet never wet.

(*b*) Soon as the port from far he has espide
His cheerful whistle merrily doth sound,
And Nereus crowns with cups; his mates him pledg around.

(*c*) And in his hand his Portesse still he bare
That much was worne, but therein little redd:
For of devotion he had little care,
Still drowned in sleepe, and most of his daies dedd.

(*d*) So few there bee
That choose the narrow path or seeke the right;
All keep the broad high way, and take delight
With many rather for to go astray,
And be partakers of their evill plight,
Than with a few to walke the rightest way.

2. It has been said that in his stanza Spenser 'invented a new instrument which he applied with a beautiful ease and mastery to the various materials on which he worked'. Comment on this statement with reference to the poem. 10

3. Daniel, in his 'Sonnets to Delia', referring to Spenser, wrote:— 10

'Let others sing of knights and palladines,
In aged accents, and untimely words'.

Was this sarcasm justified? Give reasons for your answer.

4. How would you define 'Romance'? How far does the 'Faerie Queene' appeal to you as a work of Romance? 15

Or

What influences can be traced in the poem, especially those of other authors of romantic poetry?

5. After study of the 'Faerie Queene' what do you conceive to have been Spenser's religious and political convictions? 20

6. Give, in your own words, Spenser's description of the inmates of the Palace of Holiness. Contrast them with those who dwelt in the House of Pride. 15

7. Give the meaning of the following words, adding such explanatory notes as you deem desirable:— 10

hable: warrayed: stadle: mall: agraste.

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANSKRIT (*Voluntary*)—PAPER I.

(*Group A.*)

Śrîbhâshya—First Sûtra.

1. Translate freely into English:— 10

आत्मप्रकारतया प्रतिपादनसमर्थस्तु शब्दः सहैव प्रकारतया प्रतिपादयाति। ननु च शाब्देऽपि व्यवहारे शरीरशब्देन शरीरमात्रं गृह्यत इति नात्मपर्यन्तता शरीरशब्दस्य। नैवम्। आत्मप्रकारभूतस्यैव शरीरस्य पदार्थविवेकप्रदर्शनाय निरूपकाणां निष्कर्षक-

शब्दोऽयम् । यथा गोत्वं शुक्लत्वमाकृतिर्गुण इत्यादिशब्दाः । अतो गवादिशब्दवद्देवमनुष्यादिशब्दा आत्मपर्यन्ताः । एवं देवमनुष्यादिपिण्डविशिष्टानां जीवानां परमात्मशरीरतया तत्प्रकारत्वात् जीवात्मवाचिनः शब्दाः परमात्मपर्यन्ताः । अतः परस्य ब्रह्मणः प्रकारतयैव चिदचिद्वस्तुनः पदार्थत्वमिति तत्सामानाधिकरण्येन प्रयोगः ।

2. Translate the following into English, stating the context and elucidating the ideas therein :— 16

(*a*) घटादौ दृष्टा व्यावृत्तिः सा किंरूपेति विवेचनीयम् । किं घटोऽस्तीत्यत्र पटाभावः । सिद्धं तर्हि घटोऽस्तीत्यनेन पटादीनां बाधितत्वम् । अतो बाधफलभूता विषयनिवृत्तिर्व्यावृत्तिः । सा व्यावर्तमानानामपारमार्थ्यं साधयति । रज्जुवत्सन्मात्रमबाधितमनुवर्तते तस्मात्सन्मात्रातिरिक्तं सर्वमपरमार्थम् ।

(*b*) यत्तु न दृष्टेर्द्रष्टारं न मतेर्मन्तारमिति श्रुतिर्दृष्टेर्मतेर्व्यतिरिक्तं द्रष्टारं मन्तारं च प्रतिषेधतीति तदागन्तुकचैतन्यगुणयोगितया ज्ञातुरज्ञानस्वरूपतां कुतर्कसिद्धां मत्वा न तथात्मानं पश्येः न मन्वीथाः अपि तु द्रष्टारं मन्तारमप्यात्मानं दृष्टिमतिरूपमेव पश्येरित्यभिदधातीति परिहृतम् । अथवा दृष्टेर्द्रष्टारं मतेर्मन्तारं जीवात्मानं प्रतिषिध्य सर्वभूतान्तरात्मानं परमात्मानमेवोपास्स्वेति वाक्यार्थः ।

(*c*) सोमाभावे च पूतीकग्रहणं श्रुतिचोदितम् ।
सोमावयवसद्भावादिति न्यायाविदो विदुः ॥

व्रीह्यभावे च नीवारग्रहणं व्रीहिभावतः ।
तदेव सदृशं तस्य यत्तद्द्रव्यैकदेशभाक् ॥

शुक्त्यादौ रजतादेश्च भावः श्रुत्यैव चोदितः ।
रूप्यशुक्त्यादिनिर्देशभेदो भूयस्त्वहेतुकः ॥

3. Explain the following statements pointing out their sources. In case they are variously understood, give all those senses stating whose view is favoured by each one of them :— 14

(*a*) सर्वापेक्षा च यज्ञादिश्रुतेरश्ववत् ।

(*b*) तस्यात्मपरदेहेषु सतोऽप्येकमयं हि यत् ।
विज्ञानं परमार्थो हि द्वैतमिथ्यात्वदर्शिनः ॥

(*c*) आत्मेत्येव तु गृह्णीयात्सर्वस्य तन्निष्पत्तेः ।

(*d*) मायामात्रं तु कार्त्स्न्येनानभिव्यक्तस्वरूपत्वात् ।

4. "न चैकरूपस्य शब्दस्य नादविशेषेणार्थविशेषभेदबुद्धिहेतुत्वेऽप्यसत्यात्सत्यप्रतिपत्तिः । नानानादाभिव्यक्तस्यैकस्यैव शब्दस्य तत्तन्नादाभिव्यङ्ग्यस्वरूपेणार्थविशेषैः सह संबन्धग्रहणवशादर्थभेदबुद्ध्युत्पत्तिहेतुत्वात् ।" 10

Bring out clearly the two sides of the question discussed here. Is this एकरूपत्व of शब्द accepted by the *siddhântin* ?

5. What is meant by शुभाश्रय, which one is determined to be so, and for what reasons ? 9

6. "अस्याज्ञानस्याश्रयानिरूपणादेवासंभवः पूर्वमेवोक्तः ।" 16

Briefly summarise *in Sanskrit* the argument by which this statement is proved.

7. How does the *siddhântin* show the faults of अनैकान्त्य, साधनविकलता of the दृष्टान्त, and सत्प्रतिपक्ष in the following argument :— 9

विवादाध्यासितं प्रमाणज्ञानं स्वप्रागभावव्यतिरिक्तस्वविषया-
वरणस्वनिवर्त्यस्वदेशगतवस्त्वन्तरपूर्वकम् ।
अप्रकाशितार्थप्रकाशकत्वात् ।
अन्धकारे प्रथमोत्पन्नप्रदीपप्रभावत् ।

8 "वृद्धव्यवहारादन्यत्र शब्दस्य बोधकत्वशक्त्यवधारणासंभवात् व्यवहारस्य च कार्यबुद्धिपूर्वकत्वेन कार्यार्थ एव शब्दस्य प्रामाण्यमिति कार्यरूप एव वेदार्थः । अतो वेदान्ताः परिनिष्पन्ने परस्मिन्ब्रह्मणि न प्रमाणभावमनुभवितुमर्हन्ति ।" 16

State briefly *Râmânujâchârya's* refutation of this argument.

THURSDAY, 21ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

SANSKRIT (*Voluntary*)—PAPER II.

(*Group A.*)

Ṛigveda Selections and Macdonell's History of Sanskrit Literature.

1. Translate closely into English :— 15

(*a*) अ॒पाद॑ह॒स्तो अ॑पृतन्य॒दिन्द्र॒मास्य॒ वज्र॒मधि॒ सानौ॑ जघान ।
वृष्णो॒ वध्रिः॑ प्र॑ति॒मानं॒ बुभू॑षन्पुरु॒त्रा वृ॒त्रो अ॑शय॒द्व्य॑स्तः ॥

(*b*) त्वं नो गोपाः पथिकृद्विचक्षणस्तव व्रताय मतिभिर्जरामहे ।
बृहस्पते यो नो अभि ह्वरो दधे स्वा तं मर्मर्तु दुच्छुना हरस्वती ॥

(*c*) नानौकांसि दुर्यो विश्वमायुर्वि तिष्ठते प्रभवः शोको अग्नेः ।
ज्येष्ठं माता सूनवे भागमाधादन्वस्य केतमिषितं सवित्रा ॥

(*d*) माया वां मित्रावरुणा दिवि श्रिता सूर्यो ज्योतिश्चरति
चित्रमायुधम् ।
तमभ्रेण वृष्ट्या गूहथो दिवि पर्जन्य द्रप्सा मधुमन्त ईरते ॥

(*e*) उपो रुरुचे युवतिर्न योषा विश्वं जीवं प्रसुवन्ती चरायै ।
अभूदग्निः समिधे मानुषाणामकर्ज्योतिर्बाधमाना तमांसि ॥

2 (*a*) Write grammatical notes on the words underlined in the following :— 15

(1) यच्चिद्धि व्रतं मिनीमसि,
(2) रथीरश्वं न संदितं,
(3) रिणक्ति कृष्णीररुषाय पन्थां,
(4) स्तोमाँ इयर्म्यभ्रियेव वातः,
(5) नराशंसो ग्नास्पतिर्नो अव्याः,
(6) स्पार्हा वसु मनुष्या ददीमहि,
(7) आयत्क्रत्वा न शरदः पृणैथे.

(*b*) Write the Samhitâ text with proper accents from the *padas* given below, and name the metre of the stanza :—

विश्वान् देवान् आ वह सोमऽपीतये अन्तरिक्षात् उषः त्वम् ।
सा अस्मासु धाः गोऽमत् अश्वऽवत् उक्थ्यम् उषः वाजम् सुवीर्यम्.

(*c*) Account for the difference of the accent of उषः in the two places where it occurs in (*b*), and for the accent of वस्व in उषो वाजं हि वस्व.

3. (*a*) What do you know of the *Bharatas* and *Aditi* from the hymns you have studied? 10

(*b*) 'The theory of evolution is still combined with that of creation', in the Hymn X.72 beginning with देवानां नु वयं जाना प्रवोचाम विपन्यया. Illustrate this remark in reference to the contents of the hymn.

(*c*) Is the dialogue of *Saramâ* and the *Paṇis* a personification of some natural phenomenon, or may it have a historical basis?

4. Give as full an account as you can of the vedic deity *Agni*, supporting your remarks by references to the hymns you have studied. 8

5. Determine according to Prof. Macdonell the chronological position of the *Saṃhitâs* and the *Pada* texts. 8

6. Explain fully the following remark by giving a few details :— 10

'That the *White Yajurveda* originally consisted of the first eighteen *adhyâyas* alone is indicated by external as well as internal evidence.'

7. "The literary evidence of Sanskrit authors from about 600 to 1100 A.D. supplies us with a considerable amount of information as to the state of the *Mahâbhârata* during those five centuries." 10

Give the details of this evidence and state what conclusions you are led to draw from them.

Or

Mention some prominent writers on *Astronomy* with their works and probable dates till the eminent astronomer Bhaskarâchârya. State all that you know about him and his works.

8. State what you know about the times of मनुस्मृति and याज्ञवल्क्य-स्मृति and their commentators. 10

Or

State briefly Prof. Macdonell's views about the origin of the acted drama in India, and describe the characteristic features of the Indian Drama dwelt upon by him.

9. Write what you know about the following :— 14

राजतरङ्गिणी, Kuntâpa Hymns, Aprî Hymns, अष्टाङ्गहृदय, the Śulva sûtras, बृहद्देवता, अनर्घ्यराघव, कर्पूरमञ्जरी, धनिक, बिल्हण, क्षेमेन्द्र, सोमदेव.

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANSKRIT (*Voluntary*)—PAPER I.

(*Group B*)

(*Syâdvâdamañjarî.*)

1. What is the name of the hymn commented upon in the स्याद्वाद-मञ्जरी? Explain accurately the meaning of the name. Give in detail list of the subjects dwelt upon in it. How was the author inspired to resort to this sort of composition? Did he write any other hymn of a similar type? What was the subject of that? 8

2. Translate into English the following stanza; mention the अलंकार in it, and explain clearly the idea in the third quarter of it :— 8

निःसीमप्रतिभैकजीवितधरौ निःशेषभूमिस्पृशां
पुण्यौघेन सरस्वतीसुरगुरू स्वाङ्गैकरूपे दधत् ।
यः स्याद्वादमसाधयन्निजवपुर्दृष्टान्ततः सोऽस्तु मे
सद्बुद्ध्यम्बुनिधिप्रबोधविधये श्रीहेमचन्द्रः प्रभुः ॥

3. Translate into English :— 12

अनित्यवादी नित्यवादिनं प्रत्येवं प्रमाणयति । ‘ सर्वं क्षणिकं सत्त्वात् । अक्षणिके क्रमयौगपद्याभ्यामर्थक्रियाविरोधादर्थक्रियाकारित्वस्य च भावलक्षणत्वात् । ततोऽर्थक्रिया व्यावर्तमाना स्वक्रोडीकृतां सत्तां व्यावर्तयेदिति क्षणिकासिद्धिः । न हि नित्योऽर्थोऽर्थक्रियां क्रमेण प्रवर्तयितुमुत्सहते पूर्वार्थक्रियाकरणस्वभावोपमर्दद्वारेणोत्तरक्रियायां क्रमेण प्रवृत्तेः । अन्यथा पूर्वक्रियाकरणाविरामप्रसङ्गात् । तत्स्वभावप्रच्यवे च नित्यता प्रयाति अतादवस्थ्यस्यानित्यतालक्षणत्वात् । अथ नित्योऽपि क्रमवर्तिनं सहकारिकारणमर्थमुदीक्षमाणस्तावदासीत् । पश्चात्तमासाद्य क्रमेण कार्यं कुर्यादिति चेन्न । सहकारिकारणस्य नित्येऽकिञ्चित्करत्वात् । अकिञ्चित्करस्यापि प्रतीक्षणेऽनवस्थाप्रसङ्गात् । नापि यौगपद्येन नित्योऽर्थोऽर्थक्रियां कुरुते अध्यक्षविरोधात् । न ह्येककालं सकलाः क्रियाः प्रारभमाणः कश्चिदुपलभ्यते । करोतु वा । तथाप्याद्यक्षणे एव सकलक्रियापरिसमाप्तेर्द्वितीयादिक्षणेष्वकुर्वाणस्यानित्यता बलादाढौकते करणाकरणयोरेकस्मिन्विरोधात् ।

4. Explain clearly with reference to context :— 15

(*a*) आत्मनां सर्वगतत्व एकैकस्य सृष्टिकर्तृत्वप्रसङ्गः ।

(*b*) नोत्सृष्टमन्यार्थमपोद्यते ।

(*c*) यच्च परमब्रह्मविवर्तवर्तित्वमखिलभेदानामित्युक्तं तदप्यत्र स्थलेऽन्वीयमानद्वयाविनाभावित्वेन पुरुषाद्वैतं प्रतिबध्नात्येव । न च घटादीनां चैतन्यान्वयोऽप्यस्ति मृदाद्यन्वयस्यैव तत्र दर्शनात् । ततो न किञ्चिदेतदपि ।

(*d*) ज्ञानमेवेदं सर्वं नीलाद्याकारेण प्रतिभाति । बाह्यार्थस्य जडत्वेन प्रतिभासायोगात् । यथोक्तं "स्वाकारबुद्धिजनका दृश्या नेन्द्रियगोचराः" । अलंकारकारेणाप्युक्तं "यदि संवेद्यते नीलं कथं बाह्यं तदुच्यते । न चेत्संवेद्यते नीलं कथं बाह्यं तदुच्यते" ॥ यदि बाह्यो ऽर्थो नास्ति किंविषयस्तर्ह्ययं घटपटादिप्रतिभास इति चेन्ननु निरालम्बन एवायमनादिवितथवासनाप्रवर्तितो निर्विषयत्वादाकाशकेशज्ञानवत्स्वप्नवद्वा ।

What has *Mallishena* to say against this argument?

5. How does *Mallishena* prove the following statement refuting the arguments in support of the opposite view? 15

अविशेषेण सद्बुद्धिवेद्येष्वपि सर्वपदार्थेषु द्रव्यादिष्वेव त्रिषु सत्तासंबन्धः स्वीक्रियते न सामान्यादित्रये इति महतीयं पश्यतोहरता ।

6. Which one of each of the following sets of *lakshaṇas* is preferred in the स्याद्वादमञ्जरी and why? 12

(1) 'अप्रच्युतानुत्पन्नस्थिरैकरूपं नित्यम् ।'
'तद्भावाव्ययं नित्यम्' ।

(2) 'अर्थोपलब्धिहेतुः प्रमाणम् ।'
'सम्यगनुभवसाधनं प्रमाणम् ।'
'स्वपरव्यवसायि ज्ञानं प्रमाणम् ।'

7. Whose views are the following? What is their meaning? What is the use made of them in the *Mañjari*?— 15

(*a*) त्रिविधः खल्वयं धर्मिणः परिणामो धर्मलक्षणावस्थारूपः ।

(*b*) लोहोवलस्स सत्ती आयत्था चेव भिन्नदेसम्मि ।
लोहं आगरिसंती दीसइ इह कज्जपच्चक्खा ॥
एवमिह नाणसत्ती आयत्था च्चेव हंदि लोगंतं ।
जइ परिछिंदइ सव्वं को णु विरोहो भवे तत्थ ॥

(*c*) शब्देतरत्वे युगपद्भिन्नदेशेषु यष्टृषु ।
न सा प्रयाति सांनिध्यं मूर्तत्वादस्मदादिवत् ॥

8. "नैकान्तवादे सुखदुःखभोगौ 15
न पुण्यपापे न च बन्धमोक्षौ ।"

Summarise *in Sanskrit* the arguments brought in support of these remarks in the *Mañjari*.

THURSDAY, 21ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

SANSKRIT (*Voluntary*)—PAPER II.

(*Group B.*)

Syâdvâdamañjarî and *Vivekavilâsa.*

1. What do you know of *Hemachandra?* He is called चातुर्विद्य-निर्माणैकब्रह्मा by *Mallisheṇa.* Give the meaning of this epithet and substantiate it in reference to the works composed by him. 8

State also what you know of *Mallisheṇa.*

2. Mention and explain clearly the seven *Nayas.* 15

3. Compare and contrast the attitude of the *Vedântins* and the *Jains* towards sacrifice. 5

4. State the doctrine of the *Sâṅkhyas* in detail. What authorities on it are quoted or referred to by *Mallisheṇa?* What inconsistancies does he point out in this doctrine? 12

5. Indicate briefly the faults in the doctrine of क्षणभङ्ग pointed out in the *Mañjarî.* 10

6. Explain fully and give the context of :— 14

(*a*) मानाधिका परीवाररहिता नैव पूज्यते ।

(*b*) उदयस्त्रिगुणः प्रोक्तः प्रासादस्य स्वमानतः ।
प्रासादोच्छ्रयविस्तारा जगती तस्य चोत्तमा ॥

(*c*) यमांशे गृहिमृत्युः स्यान्मृत्युः स्तमतारके ।

(*d*) स्वर्णेनापि हि किं तेन कर्णच्छेदो भवेद्यतः ।

(*e*) प्रादुर्भवति सप्तार्चिर्मथिताच्चन्दनादपि ।

(*f*) सुपक्वमपि निम्बस्य फलं बीजे कटु स्फुटम् ।

7. What is the proper time for daily dinner, and what are the necessary ceremonies and duties connected with it? 6

8. (*a*) What special features of the ground must be examined in selecting it for building a temple on it? 20

(*b*) What are the necessary subjects of study for a lay student and what are to be selected for special purposes? Hence say what qualifications [illegible] expected in a learned man.

(*c*) Explain fully and clearly the following technicalities :—

मूलराशि, स्थावरविष, मात्रा, सप्त धातवः (In the body), अष्ट गोपनीयानि, and चतुर्विधध्यान.

9. (*a*) What are the आन्तर and बाह्य circumstances necessary for acquiring excellence in study. 10

(*b*) Give briefly the rules of conduct of teacher and pupil necessary to be observed for the right performance of their duties, as taught in the विवेकविलास.

Or

Summarise the details of gentlemanly behaviour in an assembly (सभा) as laid down in the विवेकविलास.

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LATIN (*Voluntary*)—PAPER I.

HORACE—*Odes, B. III, IV.*

1. Translate into English :—

(*a*) Caelo tonantem credidimus Iovem
Regnare, praesens divus habebitur
Augustus adiectis Britannis
Imperio gravibusque Persis.
Milesne Crassi coniuge barbara
Turpis maritus vixit, et hostium—
Pro curia inversique mores! —
Consenuit socerorum in armis
Sub rege Medo Marsus et Apulus,
Anciliorum et nominis et togae
Oblitus aeternaeque Vestae,
Incolumi Iove et urbe Roma ?

(*b*) Si quis infamem mihi nunc iuvencum
Dedat iratae, lacerare ferro et
Frangere enitar modo multum amati
Cornua monstri.
Impudens liqui patrios Penates,
Impudens Orcum moror. O deorum
Si quis haec audis, utinam inter errem
Nuda leones!
Antequam turpis macies decentes
Occupet malas teneraeque sucus
Defluat praedae, speciosa quaero
Pascere tigres.

(*c*) Condit quisque diem collibus in suis,
Et vitem viduas ducit ad arbores ;
Hinc ad vina redit laetus et alteris
Te mensis adhibet deum ;
Te multa prece, te prosequitur mero
Defuso pateris, et Laribus tuum
Miscet numen, uti Graecia Castoris
Et magni memor Herculis.

(*d*) Vixere fortes ante Agamemnona
Multi; sed omnes illacrimabiles
Urguentur ignotique longa
Nocte, carent quia vate sacro.
Paulum sepultae distat inertiae
Celata virtus. Non ego te meis
Chartis inornatum silebo,
Totve tuos patiar labores
Impune, Lolli, carpere lividas
Obliviones.

2. Scan the *first* stanza, in each of the *three* passages (*a*), (*b*), *and* (*c*) in the 1st question. 9

3. Explain clearly the allusions in the following :— 18

(*a*) Fertur pudicae coniugis osculum
Parvosque natos ut capitis minor
Ab se removisse.

(*b*) Gaudet invisam pepulisse fossor ter pede terram.

(*c*) Venarique timet, ludere doctior, seu
Graeco iubeas trocho, seu malis vetita legibus alea.

(*d*) Videre Rhaetis bella sub Alpibus
Drusum gerentem Vindelici.

(*e*) Nam tibi, quo die portus Alexandrea vacuam patefecit aulam,
Fortuna lustro prospera tertio belli secundos reddidit exitus.

4. Explain the grammatical peculiarities in :— 10

(1) Metuens alterius viri certo foedere castitas.

(2) Me nunc Thressa Chloe regit, dulces docta modos.

(3) Quem legis expertes Latinae Vindelici didicere nuper, quid marte posses.

(4) (Vitulus) qua notam duxit, niveus videri, cetera fulvus.

5. Answer *any two* of the following :— 12

(*a*) Give a brief account of Pindar and the other Greek lyric poets referred to by Horace in Odes, Books III and IV.

(*b*) Give a brief summary of any *moral* or *political* ode, from these two books, quoting *one* or *two* stanzas therefrom.

(*c*) Describe briefly the wars of Augustus, after Actium, with special reference to the victories of Drusus and Tiberius.

6. Give a brief account of the life and works of (1) Catullus, and (2) Lucretius. 9

THURSDAY, 21ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LATIN (*Voluntary*)—PAPER II.

TACITUS—*Historiæ, B. I.*

1. Translate :— 40

(1) Paucis post kalendas Ianuarias diebus Pompei Propinqui procuratoris a Belgica litterae adferuntur, superioris Germaniae legiones rupta sacramenti reverentia imperatorem alium flagitare et senatui ac populo Romano arbitrium eligendi permittere, quo mollius seditio acciperetur. Maturavit ea res consilium Galbae iam pridem de adoptione secum et cum proximis agitantis. Non sane crebrior tota civitate sermo per illos menses fuerat, primum licentia ac libidine talia loquendi, dein fessa iam aetate Galbae.

(2) Nec diutius Galba cunctatus speciosiora suadentibus accessit. Praemissus tamen in castra Piso, ut iuvenis magno nomine, recenti favore et infensus T. Vinio, seu quia erat, seu quia irati ita volebant. Vixdum egresso Pisone occusum in castris Othonem vagus primum et incertus rumor : mox ut in magnis mendaciis, interfuisse se quidam et vidisse adfirmabant, credula fama inter gaudentes et incuriosos. Multi arbitrabantur compositum auctumque rumorem mixtis iam Othonianis.

(3) Aquilifer quartae legionis epulanti Vitellio nuntiat quartam et duoetvicensimam legiones proiectis Galbae imaginibus in senatus ac populi Romani verba iurasse. Id sacramentum inane visum; occupari nutantem fortunam et offerri principem placuit. Missi a Vitellio ad legiones legatosque, qui descisse a Galba superiorem exercitum nuntiarent; proinde aut bellandum adversus desciscentes aut faciendum imperatorem.

(4) "Si Vitellio et satellitibus eius eligendi facultas detur, quem nobis animum, quas mentes imprecentur, quid aliud quam seditionem et discordiam optabunt? .... Parendo potius, commilitones, quam imperia ducum sciscitando res militares continentur, et fortissimus in ipso discrimine exercitus est qui ante discrimen quietissimus. Vobis arma et animus sit: mihi consilium et virtutis vestrae regimen relinquite.

2. Explain fully the meaning of :— 25

(1) Miles urbanus longo Caesarum sacramento imbutus, postquam nec dari donativum sub nomine Galbae promissum neque magnis meritis eundem in pace quem in bello locum praeventamque gratiam intellegit apud principem a legionibus factum, pronus ad novas res scelere insuper Nymphidii Sabini praefecti imperium sibi molientis agitatur.

(2) Inde apud senatum non comptior Galbae sermo: Pisonis comis oratio. Et patrum favor aderat: multi voluntate, effusius qui noluerant, medii ac plurimi obvio obsequio, privatas spes agitantes sine publica cura.

(3) Agitasse Laco ignaro Galba de occidendo T Vinio dicitur, sive ut poena eius animos militum mulceret, seu conscium Othonis credebat, ad postremum vel odio. Haesitationem attulit tempus ac locus ...; et turbavere consilium trepidi nuntii ac proximorum diffugia.

(4) Manipuli quoque et gregarius miles viatica sua et balteos phalerasque loco pecuniae tradebant, instinctu et impetu et avaritia. Igitur laudata alacritate Vitellius vacationes centurionibus ex fisco numerat saevitiam militum plerosque ad poenam exposcentium saepius adprobat, raro simulatione vinculorum frustratur.

(5) Decernuntur Othoni omnes principum honores, adnitentibus cunctis abolere convicia et probra, quae promiscue iacta haesisse animo eius nemo sensit; omisisset offensas an distulisset, brevitate imperii in incerto fuit.

3. Describe Otho's character as portrayed in Tacitus, Histories I. 8

Or

Comment on Tacitus' statement: "(Galba) omnium consensu capax imperii, nisi imperasset."

4. What were the powers of the *princeps?* 9

Or

What was the position of the Senate and of the Equites under the Principate?

5. Mention the writings of Tacitus with their subject-matter. 8

6. How do you account for the rapid decline of literature in the first half, and for its subsequent revival in the second half, of the first century A. D.? 10

Or

In what manner did Vergil and Horace help towards the social, moral and religious reforms of Augustus?

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

FRENCH (*Voluntary*)—PAPER I.

MME. DE SÉVIGNÉ—*Lettres Choisies.*

1. Translate into English :— 20

(*a*) Parlons un peu de M. Nicole : il y a longtemps que nous n' en avons rien dit. Je trouve votre réflexion fort bonne et fort juste sur ce que vous dites de l'indifférence qu'il veut qu'on ait pour l'approbation ou l'improbation du prochain. Je crois, comme vous, qu'il faut un peu de grâce, et que la philosophie seule ne suffit pas. Il nous met à un si haut point la paix et l'union avec le prochain, et nous conseille de l'acquérir aux depens de tant de choses, qu'il n'y a pas moyen après cela d'être indifférente sur ce qu'il pense de nous. Devinez ce que je fais : je recommence ce traité ; je voudrais bien en faire un bouillon et l'avaler. Ce qu'il dit de l'orgueil et de l'amour-propre qui se trouvent dans toutes les disputes, et que l'on couvre du beau nom de l'amour de la vérité, est une chose qui me ravit. Enfin ce traité est fait pour bien du monde ; mais je crois principalement qu'on n'a eu que moi en vue. Il dit que l'éloquence et la facilité de parler donnent un certain *éclat* aux pensées : cette expression m'a paru belle et nouvelle ; le mot d' *éclat* est bien placé, ne le trouvez-vous pas ? Il faut que nous relisions ce livre à Grignan ; si j'étais votre garde pendant votre couche, ce serait notre fait : hélas ! que puis-je vous faire de si loin ? Je fais dire tous les jours la messe pour vous ; voilà mon emploi, et d'avoir bien des inquiétudes qui ne vous serviront de rien, mais qu'il est impossible de n'avoir pas.

(*b*) Nous sommes montés dans le bateau à six heures par le plus beau temps du monde ; j'y ai fait mettre le corps de mon grand carrosse, d'une manière que le soleil n'a point entrée dedans : nous avons baissé les glaces ; l'ouverture du devant fait un tableau merveilleux ; celles des portières et des petits côtés nous donnent tous les points de vue qu'on peut imaginer. Nous ne sommes que l' abbé et moi dans ce joli cabinet, sur de bons coussins, bien à l air, bien à notre aise. Nous avons mangé du potage et du bouilli tout chaud : on a un petit fourneau, on mange sur un ais dans le carrosse : voyez, je vous prie, comme tout s'est raffiné sur notre Loire, et comme nous etions grossiers autrefois que *le coeur était a gauche* : en verite, ma fille, le mien, ou à droite ou a gauche, est tout plein de vous. Si vous me demandez ce que je fais dans ce carrosse charmant, ou je n'ai point de peur, j'y pense à ma chère enfant, je m'entretiens de la tendre amitié que j'ai pour elle, de celle qu'elle a pour moi, de la sensibilité que j'ai pour tous ses intérêts, des ordres de la Providence qui nous séparent, de la tristesse que j'en ai.

2. Répondez à deux des questions suivantes,
à l'une en francais, 30
à l'autre en anglais : 20

(*a*) Quelle idee vous faites-vous de la vie d'une grande dame du dix-septième siècle : à la cour, à la ville, à la campagne, lectures, etc. ?

(*b*) Comment Mme. de Sévigne apprecie-t elle la litterature et les auteurs français et autres de son temps et du temps passe ?

(*c*) Montrez la vérite de l'observation suivante : " La vie lui a eté dure, mais elle avait une santé physique et morale qui lui a donné d'un bout à l'autre une étonnante bonne humeur."

(*d*) Commentez ces paroles de Mme. de Sévigné : " Il faut l'avouer, j'ai une belle passion pour ma fille. Je ne dis rien de mon fils ; cependant je l'aime extrêmement, et ses intérêts me font bien autant courir que ceux de ma fille."

3. (In English.) According to the letters of Mme. de Sévigné you have read, who were her best friends, and what do you know about them? 10

Or

Nature in the French literature of the seventeenth century.

4. Translate into French :— 20

(*a*) The magnitude of Richelieu's achievement grows when one considers his relations with the king. Louis XIII cordially disliked him and would gladly have got rid of him if he had not been able to convince the king of the wisdom of everything he did. Thus obliged to assume the unpleasant rôle of tutor when delicate flattery was often most needful, the minister lectured and cajoled his master, always until towards the last, giving credit to the king for his own successes, and overawing opposition by his imperious presence even when Louis was dabbling in plots against him (as in the case of Cinq-Mars) behind his back.

(*b*) Really, my dear, I believe you like my letters; you tell me so. why should you want to deceive me at the same time as deceiving yourself?

It is impossible for me to imagine the condition in which you have been without extreme emotion; and although I know you are now safe, thank God, I cannot turn my eyes towards the past without feeling a horror which distracts me.

I am in that coach for twelve consecutive hours; I spend some in eating, drinking, reading, many in looking about, in admiring; and more still in dreaming, in thinking of you.

THURSDAY, 21ST NOVEMBER.

2-30 P.M. TO 5-30 P.M.]

FRENCH (*Voluntary*)—PAPER II.

ALBERT CAHEN—*Morceaux Choisis* (*Poésie*).

1. Translate into English :— 25

(*a*) Quoi qu'il en soit, je suis attache fortement
À ne démordre point de mon habillement.
Je veux une coiffure, en dépit de la mode,
Sous qui toute ma tête ait un abri commode;
Un beau pourpoint bien long, et fermé comme il faut,
Qui, pour bien digérer, tienne l'estomac chaud;
Un haut-de-chausse fait justement pour ma cuisse;
Des souliers où mes pieds ne soient point au supplice,
Ainsi qu'en ont usé sagement nos aïeux;
Et qui me trouve mal n'a qu'à fermer les yeux.
(Molière.)

(*b*) Tout l'Olympe respire en ses détours secrets.
Là vivent de Venus les beautés souveraines;
Là des muscles nerveux, là de sanglantes veines
Serpentent; là des flancs invaincus aux travaux,
Pour soulager Atlas des celestes fardeaux.
Aux volontés du fer leur enveloppe énorme
Cède, s'amollit, tombe; et de ce bloc informe
Jaillissent, éclatants, des dieux pour nos autels;
C'est Apollon lui-même, honneur des immortels;
C'est Alcide vainqueur des monstres de Nemée;
C'est du vieillard troyen la mort envenimée;
C'est des Hébreux errants le chef, le défenseur;
Dieu tout entier habite en ce marbre penseur.
(André Chénier.)

(c) Les travaux, les chagrins ont doublé mes années;
Ma vie est sans couleur, et mes pâles journées
M'offrent de longs ennuis l'enchaînement certain,
Lugubres comme un soir qui n'eut pas de matin.
Je vois le but, j'y touche, et j'ai soif de l'atteindre;
Le feu qui me brûlait a besoin de s'éteindre,
Ce qui m'en reste encor n'est qu'un morne flambeau
Éclairant à mes yeux le chemin du tombeau.
Que je repose en paix sous le gazon rustique,
Sur les bords du ruisseau pur et mélancolique!
Vous, amis des humains, et des champs, et des vers,
Par un doux souvenir peuplez ces lieux déserts,
Suspendez aux tilleuls qui forment ces bocages
Mes derniers vêtements mouillés de tant d'orages.
(M.-J. Chénier.)

(d) La terre, qui se fend sous le soc qu'elle aiguise,
En tronçons palpitants s'amoncelle et se brise;
Et, tout en s'entr'ouvrant, fume comme une chair
Qui se fend et palpite et fume sous le fer.
En deux monceaux poudreux les ailes la renversent.
Ses racines à nu, ses herbes se dispersent;
Ses reptiles, ses vers, par le soc déterrés,
Se tordent sur son sein en tronçons torturés;
L'homme les foule aux pieds, et secouant le manche,
Enfonce plus avant le glaive qui les tranche,
Le timon plonge et tremble et déchire ses doigts.
(Lamartine.)

2. Explain the following lines and state from what works they are taken.—

(a) Au *Cid* persécuté *Cinna* doit sa naissance.

(b) Rien n'est beau que le vrai, le vrai seul est aimable.

(c) Malheur à tout mortel, surtout dans notre âge,
Qui se fait singulier pour être un personnage!
Piron seul eut raison, quand dans un goût nouveau,
Il fit ce vers heureux, digne de son tombeau:
"Ci-gît qui ne fut rien." Quoi que l'orgueil en dise,
Humains, faibles humains, voilà votre devise.

(d) Attendiez-vous, pour faire un aveu si funeste,
Que le sort ennemi m'eût ravi tout le reste,
Et que, de toutes parts me voyant accabler,
J'eusse en vous le seul bien qui me pût consoler?

3. Name the authors and the approximate time of publication of th following works —

Psyché, Britannicus, Le Joueur, Rhadamiste et Zénobie; L Glorieux, La Henriade, Tibère; Abufar ou la Famili Arabe, Les [illegible], *Les Enfants d'Édouard.*

4. State what you know of the life and works of *Alfred de Vign M.-J. Chénier*, and *Millevoye.*

5. Faites en français une analyse sommaire de "l'Epître VII à Racine (Boileau) et du morceau "A la Beauté" (Delille.)

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

AVESTA AND PAHLAVI (*Voluntary*)—PAPER I.

AVESTA—*Yasna* 35—42;
PAHLAVI—*Dinkard* (*Dastur Peshotan's*), *Vol. V*, *pp.* 213—233.

1 Translate :—

(*a*) [illegible]

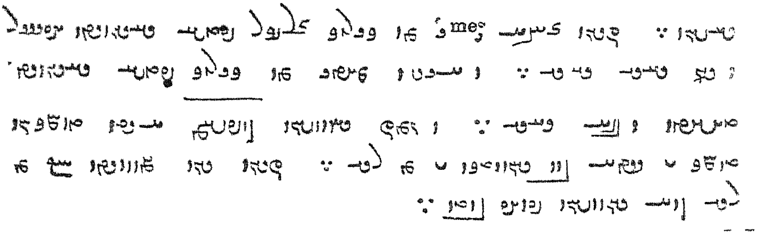
(*b*) [illegible]

(*c*) [illegible]

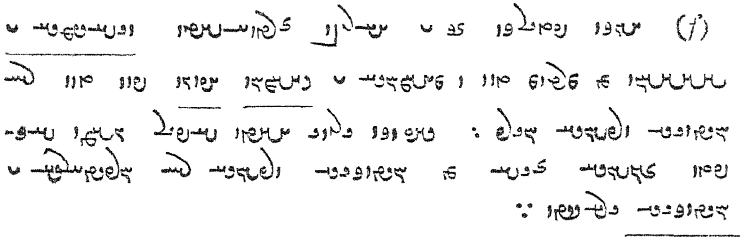
[illegible]

(*d*) [illegible]

(*e*) [illegible]



(f)



2. Annotate the words underlined in Question 1. 13

3. (a) Give the substance of the *Yasna Haptanghâiti*. Show clearly the distinction, as regards style and ideas, between the *Gâthâs* and the *Haptanghâiti*. 13

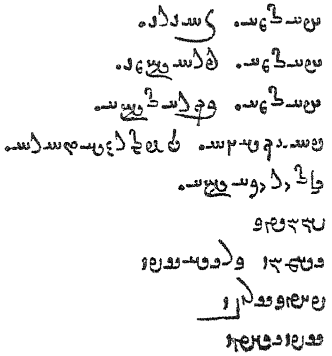
(b) What ideas of eschatology do you gather from the *Haptanghâiti*?

4. (a) Quote or refer to the Gâthic texts on which the writer of the *Dînkart* might have based his chapter as regards the ten commandments of Zarathustra. 13

(b) Who was Akht-jâtûk? Illustrate, in your own words, his misrepresentations of Zarathustra's Commandments.

5. Explain the views of the *Dînkart* writer as regards the *chihâr âînînak awa[illegible]r î Dâtâr Aûhrmazd val hûnisngarān khelkûnt.* 13

6. Write what you know of— 13



THURSDAY, 21ST NOVEMBER.
[2-30 P M TO 5-30 P M]

AVESTA AND PAHLAVI (*Voluntary*)—PAPER II.

Vendidâd VIII and XIX (Avesta and Pahlavi)
Geldner's Essay on the Avesta Literature
Dr. West's Essay on the Pahlavi Literature

20

1. Translate into English :—

(*a*) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(*b*) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(*c*) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(d) [illegible]

2. Annotate the following :— 10

[illegible]

3. (a) Explain with reference to the context :— 10

[illegible]

(b) What idea would you form regarding the author's conception of the personality of Zarathushtra from the above taunt and the way in which it is met by the prophet ?

4. Explain fully the sentiments expressed in the passage marked (d) in Question I both by the Avestan author and the Pahlavi commentator, and make your own comments thereon. 10

5. Comment on the following observation of Dr. Geldner: "The Gâthâs always bring us back again to the fundamental ideas of the Mazda-religion." 10

6. (a) What is the characteristic of the *Vendidâd* and what are its contents ? 10

(b) Could the *Vendidâd* have been meant originally, or was it used at any historical stage in ancient Persia, as a ceremonial text ? Give reasons for your answer.

7. State some of the merits and demerits of the Pahlavi translations of the Avesta texts, and how far these translations facilitate and help Avesta research. 10

8. Institute a comparison between the *Dînkart* and the *Dâdistân-i-Dînîk* with reference both to the style and the substance of the two works. 10

9. State the threefold division in which Dr. West comprises the whole of Pahlavi literature. Name one work from each of these three divisions and give succinctly some idea regarding the works you name. 10

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PERSIAN (*Voluntary*)—PAPER I.

Translate :— 25

(*a*)
عدل تو قندیل شب افروز تست
مونس فردای تو امروز تست
دست بدار از سر بیچارگان
تا نخوری ناچخ غمخوارگان
چند زنی تیر بهر گوشهٔ
غافلی از گوشهٔ بی توشهٔ
شاه بدانی که جفا کم کنی
گر دگران ریش تو مرهم کنی

(*b*)
موبدی از کشور هندوستان
ره گذری کرد سو بوستان
مرحلهٔ دید منقش رباط
مملکتی یافت مزور بساط
غنچه بخون بسته چو گردون کمر
لالهٔ کم عمر ز خود بی خبر
سبزه شده خستهٔ پیکان خویش
بید بلرزه شده بر جان خویش
زلف بنفشه رسن گردنش
دیدهٔ نرگس درم دامنش
لاله گهر سوده و فیروزه گل
یکشبه بد لاله و یکروزه گل

2. Explain with reference to the context :— 10

(*a*) صبح برآمد چه شوی مست خواب
کز سر دیوار گذشت آفتاب
چشمهٔ مهتاب تو سردی گرفت
لالهٔ سیراب تو زردی گرفت

(*b*) نقش وفا بر سر یخ میزنند
بر مه و خورشید زنخ میزنند

(*c*) لب طبری وار طبر خون بدست
مغز طبرزد بطبر خون شکست

(*d*) باد یمانی به سهیل نسیم
ساخته کیمخت زمین را ادیم

3. Annotate :— 10

ملک نیمروز - گندم آدم فریب - نعل در آتش - زر شش سری - گرگ آشتی - میل کشیدن - سپرغم - ابلق ختلی - قلعه قلعی آب معلق

4. Reproduce (in Persian or English) the substance of the stories which illustrate any *two* of the following maxims :— 12

(*a*) دشمن دانا که غم جان بود
بهتر ازان دوست که نادان بود

(*b*) راستی آنجا که علم بر زند
یاری حق دست بهم بر زند

(*c*) بر دل و دستی همه خاری بزن
تن مزن و دست بکاری بزن

(*d*) هر که درین خانه شبی داد کرد
خانهٔ فردای خود آباد کرد

5. Give a brief sketch of the life and writings of Nizami Ganjawi, stating the name and title of the patron to whom the *Makhzanul Asrar* is dedicated. 12

6. Explain the allusions in — 10

(a) موسی ازین جام تهی دید دست
شیشه به که پایهٔ ارنی شکست

(b) خضر عنان زین سفر خشک تافت
دامن خود تر شدهٔ چشمه یافت

(c) سام که سیمرغ پسر گیر داشت
بود جوان گرچه پسر پیر داشت

(d) دجله بود قطرهٔ از چشم کور
پای ملخ بز بود از دست مور

(e) گر کنم اندیشه زگرگان پیر
یوسفیم بین و بمن برمگیر

7. Paraphrase :— 16

ای سپر افگنده ز مردانگی
شغل تو بیغولهٔ بیگانگی

غرّه به ملکی که بقائیش نیست
زنده بعمری که وفائیش نیست

چرخ نهٔ محضر نیکی پسند
نیک در اندیش ز چرخ بلند

پی سپر جرعهٔ می خوارگان
دست خوش بازی سیارگان

مصحف و شمشیر بینداخته
جام و صراحی عوضش ساخته

رابعه با ثامن آن هفت مرد
بنگر تا گیسو خود را چه کرد

ای هنر از مردی تو شرمسار
از هنر پیرزنی شرم دار
چند کنی دعوی مردانگی
کم زن کم زن که کم از یک زنی

Thursday, 21st November.

[2-30 P.M. TO 5-30 P.M.]

PERSIAN (*Voluntary*)—Paper II.

1. Translate into English :— 2

(a) تجار ایران بسیار متمولند هیچ صنفی از مردم
در اغتشاش مملکت و در تحت بدترین پادشاهان بیش
ازین طبقه از حیثیت جان و مال ایمن نبوده اند
و سبب ظاهر است زیرا که تجارت ممد مداخل
ملکی بلکه ماده مالیه ست و ظلم ببعضی دون
بعضی ممکن نیست از آنرو که نهب اموال یکی
موجب وحشت جمیع است - اعتماد صنفی و تجارت
مقطوع خواهد شد بعلاوه اینکه تجار ایران با بلاد
اطراف معاملت دارند لهذا هر پادشاهی که
با این طبقه در افتد خود را رسوای جمیع اطراف
میسازد لاکن با این حال توزیعات بسیار بعنوان
قرض بایشان شده است و باسمهای دیگر نیز بعضی
از اوقات ایشانرا عرضهٔ اخذ و جلب ساخته اند

(b) بالجمله هیچ مطلبی بجهت مملکتی مهم تر
از وضع لشکری که حافظ آزادی ملت است
نیست و واضح است که وضع لشکر باید مناسب

با وضع حکومت باشد والا در محافظت ملک فایدهٔ که ازان متوقع است بر آن مترتب نخواهد شد سلطنت بقهر و غلبه و عاری از تعلیم و تربیت همیشه در خطر آن است که بهمان اسبابی که موجب ایجاد و باعث قوام آن شده است زوال یابد و قهاریتی که مایهٔ حفظ پادشاهی است سبب عدم ترقی رعایا است زیرا که رعیت هرگز زحمت بجهت حصول یا تحصیل چیزی که احتمال آن دارد که بظلم از ایشان انتزاع شود نخواهند کشید

2. (*a*) Write full notes on — 14

صادر - گرم سیر - عرف - ایمه اربعه - وهابی

(*b*) Distinguish between—

سرباز and جانباز
دین and شریعت

3. Explain :— 12

(*a*) خرابی قناتی چند که بزحمات و مخارج زیاد میساختند دره خرم را بیابان بی آب و علف و باغ ارم را نمونه قاع صفصف کرده است

(*b*) اما در فتن و انقلاباتی که درین اواخر در ایران روی داد باز مورث انتعاش قوای این طایفه گشته آبی بر روی کارشان آورد

(*c*) خلاف تدبیر و عقل میدانند که نام و مهر پادشاه را بکسی بسپارند که احتمال آن میرود که دست آویز بزرگی خود کند

(d) در رسالهٔ مشهورش (خواجه نصیرالدین طوسی) که در اخلاق نوشته تحقیقات فیلسوفانه در حکمت عملی و شایستگی حرکات انسانی و سعادت و صلاح و اسباب اجتناب و احتراز از صفات ردیه و معالجهٔ آن دارد

4. Give an outline of the commencement and development of تصوف, mentioning the principal doctrines and مقامات سلوک 1

5. Give an account of the progress of the inhabitants of Persia in literature and the various arts and sciences, as recorded by Sir John Malcolm 1

6. How does Sir John Malcolm justify the following statement:—

در هیچ مملکت پادشاه بشخصه بیش از پادشاه ایران مواظب امور نیست

7. Give, in Persian, a summary of the discussion between ملا ابراهیم نظام بصری and حسنیه in the Court of خلیفه هارون الرشید 1

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LOGIC AND MORAL PHILOSOPHY—PAPER I.

N.B.—Answer eight questions only.

1. Are words names of things, or of our ideas? Discuss the question of the connotation of general names, individual names, and abstract names. 1

2. What does Mill hold to be the essential nature of a proposition? Criticise his view.

3. Adduce arguments to show that the Syllogism is a means of discovering truth. In what does Mill consider its value to be?

4. Expound Mill's doctrine as to the origin and validity of the axioms and conceptions of Geometry, comparing his view with Kant's. What is your own view on this question?

5. Explain why Mill's philosophical position made him wish to prove that all reasoning is from particulars to particulars, and critically examine the arguments he adduced to prove that it is so.

6. What is the great principle which guarantees the validity of the experimental methods in Mill's view? Criticise his attempt to show that this principle is itself empirically discovered and proved.

7. Explain what is meant by the Method of Agreement, illustrating your answer by referring to a concrete application of the Method. Is such a method ever actually used in scientific investigation? 12

8. What does Mill mean by an empirical law as distinguished from a law of nature? Can he consistently maintain this distinction? 12

9. "The uniformities of co-existence, whether derivative or ultimate, have the evidence only of empirical laws, for there is no general axiom to which they are related, as there is in the case of the uniformities of succession." Explain and criticise this statement. 12

10. "Mill affected to get rid of universal reasoning, which, if accomplished, would be to get rid of science and logic altogether; yet of course he employed or implied the use of universals in almost every sentence of his treatise." Justify, or refute, this criticism. 13

TUESDAY, 19TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

LOGIC AND MORAL PHILOSOPHY—PAPER II.

N.B.—Answer only *eight* questions.

1. State the main arguments in Kant's Essay on the "Only *possible* ground for demonstrating God's existence". 12

2. What does Kant understand by Dogmatism in Philosophy? 13

Show that Kant was "awakened from his dogmatic slumbers" when he wrote his treatise on the "Attempt to introduce negative quantities into Philosophy".

3. What conclusions does Kant arrive at regarding the nature of spiritual beings in his essay on the "Dreams of a Ghostseer"? 12

4. Trace briefly the development of "English empiricism" from Bacon to Hume. 13

5. What does Kant mean by *form* and *matter* of knowledge? Explain, giving reasons: "Time and space are not so much forms *of* sense; rather sense-perception in its generic subjective aspect, means these forms." 13

6. Describe fully the acts of synthesis that are needed in order to rise from a mere sensation to a perception of an object. Explain the term "transcendental apperception". 12

7. Explain with an illustration the relation between 'Categories' and 'Schemata'. 12

8. What is meant by Ideas of Reason? Explain by referring to Kant's criticism of Rational Cosmology how no science can be based on these Ideas. 13

9. What is in Kant's view the Highest Good? How does he arrive at the conception, and what inferences does he draw from it regarding the essential nature of man? 12

10. Give Kant's account of æsthetic pleasure and explain how æsthetic judgments possess general validity. What place have they in Kant's system of Philosophy? 12

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

LOGIC AND MORAL PHILOSOPHY—PAPER III.

N.B.—Only eight questions to be answered.

1. Martineau explains his own system of Ethics neither at the beginning nor at the end of his book, but in the midst of the accounts of the doctrines of other thinkers. Explain, with reference to his classification of Ethical Theories, the reasons that have led him to follow this arrangement. What, according to him, is the essence of a Psychological method of Ethics? 13

2. Explain Comte's triple law governing the intellectual development of the human race. What are Martineau's reasons for rejecting it? 12

3. Explain and criticise Comte's view that Psychology should be merged into Physiology of the brain. Give his account of the feeling of individuality. 12

4. Give briefly the arguments by which Martineau proves that the objects of our moral judgments are "our own inner principles of self-conscious action, as freely preferred or excluded by our will". 13

5. Martineau's system of Ethics is said to be too individualistic. What doctrines of his lend support to this view? Do you think the criticism is justifiable or do you know of anything that Martineau has said which would refute it? 13

6. Give Martineau's rule for distinguishing a *right* action from a *wrong* one and compare it with that of Bentham. How does Martineau reply to the criticism that his rule is reducible to that of 'Rational Benevolence'? 12

7. Give Martineau's account of Justice and explain how it supplies a new spring of action. 12

8. According to Mr. Lecky, Mill's admission that we have the power to recognise a distinction of *kind* in our pleasures, makes the difference between him and intuitive moralists not very much more than verbal. Can you justify this remark? 12

9. "The evolutionary Ethics have no Psychology of their own, but merely pick up what best suits of the old material, and fit it in with the purely *physiological* story they have to tell". Explain this remark of Martineau, illustrating it by giving Spencer's account of the genesis of Ethics. 13

10. Give the explanations of the feeling of remorse given by (1) James Mill and (2) by Darwin; and state briefly the grounds on which Martineau finds both of them inadequate. 12

THURSDAY, 21ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

LOGIC AND MORAL PHILOSOPHY—PAPER IV.

N.B.—Answer eight questions only.

1. Show how Aristotle applies his conception of Final Cause to the study of Ethics. What is his ultimate conclusion as to what the Good is? 13

2. Illustrate Aristotle's method of treating the moral virtues with reference to their subject-matter, and to their opposites, by summarising his discussion of courage. 12

3. Discuss the question as to whether the doctrine that virtue is a mean may reasonably be maintained with reference to the following three virtues :— 12

Liberality, agreeableness, and truthfulness.

4. Discuss and criticise Aristotle's reasons for supposing that the intellectual are superior to the moral virtues. 13

Show the relation of science and intuitive reason to wisdom.

5. Explain the principles of distributive justice (*a*) in an Aristocratic State, (*b*) in a Democracy. 12

What is Aristotle's answer to the question, "Can a man do injustice to himself?"

6. Show how it is consistent with Aristotle's definition of virtue and vice that there should be characters between these. Discuss the two most important of these characters, comparing them with the virtue and vice to which they respectively to some extent correspond. 13

7. What, in Aristotle's view, is the relation of pleasure to virtue? 12

8. "Aristotle in forming his ethical theory takes no account of the future life." Discuss this, comparing Aristotle with Kant in this respect. 12

9. "In the *matter* of morals [as distinguished from the *form* of ethical theories] the world has clearly out-grown the Ethics of Aristotle." Discuss this, not in general terms, but with reference only to specific virtues. 13

10. Discuss the following quotation from Aristotle in such a way as to make it clear how, in his view, Politics can secure the practical application of Ethics. "Now, what makes men good is held by some to be nature, by others habit (or training), by others instruction." 12

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ANALYTICAL GEOMETRY AND HYDROSTATICS.

N.B.—Not more than eight questions should be attempted, of which four at least must be from the first eight and three at least from the last five.

For the B.Sc. Examination three-fourths of the total will be taken.

1. Find the area of a triangle the coordinates of whose vertices are given. Deduce that, the base and area of a triangle being known, the locus of its vertex is a straight line parallel to the base. 10

A, B, C, D are four given points. Find the locus of a point P such that the sum of the areas of the triangles PAB and PCD is constant.

2. Show that a homogeneous equation of the nth degree in x, y represents n lines through the origin. Find the condition that two of the lines given by the equation $ax^3 + 3bx^2y + 3cxy^2 + dy^3 = 0$ may be perpendicular. 15

Find the equation of the four lines which join the origin to the four points of intersection of $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ and $x^2 + y^2 - r^2 = 0$.

3. Find the condition that the line $y = mx + c$ may touch the circle $x^2 + y^2 = r^2$ and find the coordinates of the point of contact in terms of m. 15

O, O' are the centres of two circles; a line parallel to OO' meets one circle in P and the other in Q. OP and $O'Q$ meet in R. Prove that the locus of R is a circle coaxial with the given ones.

4. Find the equation of the normal to a parabola at any point in terms of its slope. 18

PQ is a chord of a parabola normal at P; PP' is a chord perpendicular to the axis. Show that QP' and PQ cut the axis at points equidistant from the vertex. Further, if X is the foot of the directrix, PX and QP' intersect at R whose locus is a parabola.

5. Obtain the equation of the pair of tangents that can be drawn from the point (h, k) to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. 15

Show that the points from which pairs of tangents can be drawn perpendicular to the tangents from (h, k) are the points of intersection of the hyperbolas

$$xy\,(h^2 - a^2) + hk\,(y^2 - b^2) = 0$$
$$xy\,(k^2 - b^2) + hk\,(x^2 - a^2) = 0$$

6. Find the equation of a hyperbola referred to its asymptotes. 12

P and Q are two points on a hyperbola, prove that the tangents at P and Q meet CQ and CP respectively in points whose distances from the centre C are in the ratio $CQ : CP$.

7. Obtain the equations of the tangent and normal at any point on the conic $l = r\,(1 + e\cos\theta)$. 17

Show that the locus of the intersection of normals at the extremities of chords passing through a focus is an ellipse.

8. Given a fixed ellipse and a concentric coaxial ellipse of equal area: if θ, ϕ be the eccentric angles of a point of intersection of the two, then $\theta + \phi = \frac{\pi}{2}$. If the fixed ellipse be a circle and if ω be the angle between the moving ellipse and the circle at the point of intersection, then $\tan\omega\tan 2\theta = 2$. 12

9. Define the centre of pressure of a plane area and find it in the case of a triangle immersed in a homogeneous liquid with its vertex in the surface and base horizontal. 11

A trapezium whose parallel sides are of length a and b is immersed with the side of length a in the surface. If the depth of the opposite side be c, show that the depth of the centre of pressure is $\frac{a + 3b}{2(a + 2b)} \cdot c$.

10. Obtain the conditions of equilibrium of a body floating in a liquid and partially supported at a point. 14

AB, BC are two rods hinged at B, the former being heavier and the latter lighter than water. The two rods float in water with the end A freely hinged at a fixed point in the surface of the water. Prove that the specific gravity of the rod AB is equal to $\frac{ab + 2by - 2y}{ab}$ where $2a$, $2b$ are the lengths of the rods and $2y$ the length of the immersed portion of the lighter rod.

11. Describe the common hydrometer and show how it can be graduated. 12

A Nicholson's hydrometer, eleven ounces in weight, requires an additional ounce to sink it up to the mark in pure alcohol (s.g. = ·795); but a wine merchant on putting it into a sample, finds it requires 2 ozs.; to what extent has the sample been adulterated with water?

12. Enunciate the laws of Boyle and Charles and explain the construction and working of the common air pump. 17

In a condenser the piston does not reach the bottom of the cylinder in which it works. Show that after n strokes the pressure in the receiver is

$$\Pi \left\{ \frac{v + x}{x} - \frac{v}{x} \left(\frac{V}{V + x} \right)^n \right\}$$ where Π is the pressure of the atmosphere

and x, $v + x$ are the least and greatest volumes between the piston and bottom of the cylinder and V is the volume of the receiver.

13. Find the surfaces of equal pressure when a uniform liquid is rotating as if rigid about a vertical axis. 15

A closed cylindrical vessel is three-quarters full of liquid, the rest of the vessel being a vacuum. It is made to rotate with such an angular velocity about its axis (supposed vertical) that the base is just free from water at its middle point. Find the upward force on the top of the vessel and its ratio to the weight of the liquid in the vessel.

TUESDAY, 19TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

ALGEBRA, TRIGONOMETRY AND SOLID GEOMETRY.

N.B.—Only nine questions should be attempted. (For the B. Sc. Examination three-fourths of the total will be taken)

1. If in the infinite series, $u_0 + u_1 + u_2 + \ldots\ldots\ldots$, where all the terms are positive, the terms after any term u_m are such that $\frac{u_{n+1}}{u_n} < k$, where k is some quantity numerically < 1, prove that the series converges. 9

Find the conditions under which the infinite series, $1^m + 2^m x + 3^m x^2 + \ldots$, converges.

2. Under what conditions has the series 13

$$f(n) = 1 + nx + \frac{n(n-1)}{2!}x^2 + \frac{n(n-1)(n-2)}{3!}x^3 + \ldots\ldots\ldots$$ a meaning? Prove that when these are satisfied $f(m).f(n) = f(m+n)$. Hence interpret $f(n)$ when n is a *positive* rational number.

Find the greatest term in $(1 + x)^{-12}$ when $x = \frac{1}{5}$.

Evaluate $\sqrt[5]{35}$ to four places of decimals.

3. Expand $\log_e(1 + x)$ in powers of x when $1 > x > -1$, taking for granted the expansion of a^x. 10

Shew that—

$$1 + \frac{2}{1.2.3} + \frac{2}{3.4.5} + \ldots\ldots + \frac{2}{(n-1)n(n+1)} + \ldots\ldots = 2\log_e 2.$$

4. Assuming that a rational algebraic equation has a root, prove that it has as many roots as it has dimensions and no more. 12

Having given that two roots of the equation

$$25x + 40x^3 - 4x^2 + 15x - 4 = 0$$

are $\sqrt{-1}$ and $5^{-\frac{1}{3}} - 5^{-2}$, find all its results, verify your result by actually constructing the equation with all these roots.

5. Deduce a method for obtaining the equation whose roots are less by some quantity a than those of the equation 14

$$x^n + a_1 x^{n-1} + a_2 x^{n-2} + \ldots\ldots + a_n = 0$$

and transform the equation $x^3 + ax^2 + bx + c = 0$ into another in which the second term is missing.

Solve the equation $800x^4 - 100x^2 - x + 3 = 0$.

6. Find expressions for the radii r, R of the inscribed and circumscribed circles of a triangle, and prove the relation $r = 4R \sin\frac{1}{2}A \sin\frac{1}{2}B \sin\frac{1}{2}C$ 11

If I_2, I_3 are the excentres in the same line with A, prove that $I_2 I_3 = 4R \cos\frac{1}{2}A$. Hence get an expression for the area of the triangle formed by joining the incentre to two excentres.

7. Define the modulus and the amplitude of a complex quantity. Shew how the nth roots of any complex quantity may be found. In particular, find the nth roots of unity, and the values of $(\sqrt{-1})^{\frac{1}{3}}$ 12

$$\text{Sum the series } x + \frac{x^5}{5!} + \frac{x^9}{9!} + \frac{x^{13}}{13!} + $$

8. Explain clearly what is meant by $\tan^{-1} x$. Prove that 14

$$\text{(i) } \theta + n\pi = \tan\theta - \frac{\tan\theta}{3} + \frac{\tan_4\theta}{5} - \ldots\ \ldots.$$

$$\text{(ii) } \frac{1 - x^2}{1 - 2x\cos\theta + x^2} = 1 + 2x\cos\theta + 2x^2\cos 2\theta + 2x\cos 3\theta + \ldots\ldots$$

$$\text{(iii) } \frac{1-x}{1+x} - \frac{1}{3}\left(\frac{1-x}{1+x}\right) + \frac{1}{5}\left(\frac{1-x}{1+x}\right)^5 \ldots\ldots$$
$$= 1 - x - \tfrac{1}{3}(1 - x^3) + \tfrac{1}{5}(1 - x^5) - \ldots\ldots\ldots.$$

9. If a plane is perpendicular to one of two parallel straight lines, it is also perpendicular to the other. 11

A tetrahedron has its opposite edges perpendicular. Prove that perpendiculars from the vertices to the opposite faces meet in a point, and that the shortest distances between the opposite edges pass through that point.

10. Find the area of the slant surface of the frustum of a right cone. 14

A frustum of a right cone, whose height is h, is such that a sphere can be inscribed in it. Prove the area of the slant surface to be πl^2 and the volume $\frac{1}{3}\pi h\left(l^2 - \frac{h^2}{4}\right)$, where l is the slant height.

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

DIFFERENTIAL AND INTEGRAL CALCULUS

N.B.—Not more than four questions from the first six and not more than four from the last six should be attempted.

For the B.Sc. examination three fourths of the total will be taken.

1. Prove that $\frac{dy}{dx} \cdot \frac{dx}{dy} = 1$. Give a geometrical illustration. 14

Differentiate the following expressions with respect to x —

$$\sin^{-1}\left(\frac{e^{ax} - e^{-ax}}{e^{ax} + e^{-ax}}\right), \quad (\sin x)^{\cos^{-1} x},$$

$$\tfrac{1}{2}\log\left(x + \sqrt[3]{1 - x^3}\right) - \frac{1}{\sqrt{3}}\tan^{-1}\frac{2\sqrt[3]{1 - x^3} - x}{x\sqrt{3}}.$$

2. Enunciate the conditions under which 13

$$f(x + h) = f(x) + h f'(x) + \frac{h^2}{2} f'(x + \theta h)$$

and supposing those conditions satisfied, prove this result.

If $x = \tan \log y$, prove that

$$(x^2 + 1)\frac{d^{n+1}y}{dx^{n+1}} + (2nx - 1)\frac{d^n y}{dx^n} + n(n - 1)\frac{d^{n-1}y}{dx^{n-1}} = 0;$$

hence show, by means of MacLaurin's theorem, that if

$$y = a_0 + a_1 x + a_2 x^2 + \ldots, \quad (n + 1)\,a_{n+1} + (n - 1)\,a_{n-1} = a_n$$

expand y in powers of x as far as x^6.

3. Find the value of $\frac{\phi(x)}{\psi(x)}$ as x approaches a and $\phi(a) = 0$ and $\psi(a) = 0$. 12

Find the value, as x approaches zero, of—

(1) $\dfrac{(1 + x)^{e^{-x}} - (1 - x)e^{x}}{x(e^{x} - e^{-x}) - 2x^2 e^{-x}}$.

(2) $\dfrac{3x \log\left(\frac{\sin x}{x}\right)^2 + x^3}{(x - \sin x)(1 - \cos x)}$

4. Explain how the differential calculus can be applied to problems of maxima and minima of functions of one variable. 16

(i) Find the greatest and least values of $(\sin x)^{\sin x}$.

(ii) At what point of an ellipse is the normal most distant from the centre; find this greatest distance.

5. If ψ be the inclination to the axis of x of the tangent at the point (x, y) of a curve, and A the area between the coordinate axes, the curve and the ordinate y, prove that 1

$$\frac{dy}{dx} = \tan\psi;\ \frac{dA}{dx} = y;\ \frac{d^2y}{dx^2}\cdot\frac{dA}{d\psi} = \frac{dA}{dx}\left\{1 + \left(\frac{dy}{dx}\right)^2\right\}.$$

Find the equation of the normal at the point $(a\cos^4\phi, a\sin^4\phi)$ on the curve $x^{\frac{1}{2}} + y^{\frac{1}{2}} = a$ in the form

$$16\,(x\cos^2\phi - y\sin^2\phi) = a\,(15\cos 2\phi + \cos 6\phi).$$

6. Find the asymptotes of the curve 1

$$x^n\phi\left(\frac{y}{x}\right) + x^{n-1}\psi\left(\frac{y}{x}\right) + x^{n-2}\chi\left(\frac{y}{x}\right) + \dots = 0$$

when $\phi(\mu) = 0$ has all its roots unequal; also consider the condition necessary for two parallel rectilinear asymptotes if $\phi(\mu) = 0$ has two equal roots and the rest different.

Find the asymptotes of the curve—

$$x^3 - y^3 + x^2y - xy^2 + x^2 - 2y^2 - xy + x + 2y = 0.$$

7. Prove the rule for integration by parts and integrate xe^{ax}. 1

Deduce $\int x\cos bx\, e^{cx}\,dx$.

Find $\int x^2\sin^{-1}x\,dx$, $\int(\tan x + \sec x)^4\sec^2 x\,dx$, $\int\frac{dx}{(1+x)^2\sqrt{x}}$.

8. What is a formula of reduction? Find the formula connecting the integrals of $\sin^m\theta\sec^n\theta$ and $\sin^m\theta\sec^{n-2}\theta$. 10

If $u_n = \int(\sin x + \cos x)^n\,dx$, prove that

$$n\,u_n = (\sin x + \cos x)^{n-1}(\sin x - \cos x) + 2\,(n-1)\,u_{n-2}$$

9. Explain how to find $\int\frac{dx}{(x-p)\sqrt{ax^2+bx+c}}$ in all circumstances. 15

Find $\int\frac{dx}{(x-1)\sqrt{x^2+2x+3}}$ and $\int\frac{3x-5}{(x-1)^2\sqrt{x^2+4}}\,dx$.

10. Prove the following results:— 17

(1) $\int_0^{\frac{\pi}{2}}\log\sin\theta\,d\theta = \frac{\pi}{2}\log\frac{1}{2}$.

(2) $\int_0^{\frac{\pi}{2}}\sin\theta\log\sin\theta\,d\theta = \log\frac{2}{e}$.

(3) $\int_0^{\pi}\theta^3\log\sin\theta\,d\theta = \frac{3\pi}{2}\int_0^{\pi}\theta^2\log(\sqrt{2}\sin\theta)\,d\theta$.

(4) $\int_{\frac{3}{4}}^{\frac{4}{3}} -\sqrt{x^2+1}\,dx = \frac{125}{288} + \frac{1}{2}\log\frac{3}{2}$.

11. Show how to find the length of the arc of any curve when its cartesian equation is known and use your formula to find the length of the arc of the parabola $y^2 = 4ax$ from its vertex to any point P in terms of x. 12

The major axis of an ellipse is 1 foot in length and its eccentricity is $\frac{1}{10}$; prove that its circumference is 3·13372 feet nearly.

12. Trace the curve $y^4 - 2axy^2 + x^4 = 0$ and show that the area of the curve and the volume generated by its revolution round the axis of x are respectively $\frac{\pi}{2\sqrt{2}}a^2$ and $\frac{2\pi}{3}a^3$. 15

THURSDAY, 21ST NOVEMBER.

[2 30 P.M. TO 5-30 P.M.]

STATICS AND DYNAMICS.

1. Prove that if three forces acting at a point are in equilibrium the ratio of any force to the sine of the angle between the other two is the same for all. 9

A small ring of weight, W, moves on a smooth vertical hoop. Attached to it is a string which passes over a pulley at the end of a horizontal diameter and bears a weight $2W$. Prove that the angle $2a$ which the radius drawn to the ring makes with the horizontal diameter is given by $\cos a = \frac{1 \pm \sqrt{3}}{2}$, and show by a sketch the only possible position of equilibrium for the ring. Find also the pressure of the hoop on the ring in this position.

2. Investigate the conditions of equilibrium of a system of forces in one plane. 10

Two equal rods AB, BC of length $2a$ are connected by a free hinge at B; the ends A and C are connected by an inextensible string of length l; the system is suspended from A. Prove that in order that the angle between AB and the vertical may be the greatest possible, l must be equal to $\frac{4a}{\sqrt{3}}$.

3. Define a couple, and show that two couples in the same plane with equal moments are entirely equivalent. 9

ABC is a triangle and P, Q, R are the centres of its escribed circles. QR, RP, PQ represent three forces in magnitude and line of action; show that they reduce to a couple whose moment is $\frac{abc}{r}$ where a, b, c are the sides of the triangle and r the radius of its inscribed circle.

4. From body of weight W a piece of weight w is cut off and moved a distance x; show that the C. G. of the whole is thereby moved a distance $x\frac{w}{W}$ in that direction. 11

On the hypotenuse of a right-angled triangle a square is described on the side of the right angle. Find the position of the C.G. of the area of the

5. Define coefficient of friction, and show how this idea is connected with the angle of friction. 9

A particle on the outside of a rough circular hoop (coefficent of friction, μ) is acted upon by two forces, varying as the distance, one attractive and the other repulsive, situated at the extremities of a diameter. Find the limiting positions of equilibrium.

6. If a body is moving with uniform acceleration f, find how far it moves in the nth second if it starts with a velocity u. 8

A heavy body is let fall from rest. When it has fallen a distance a, another heavy body, which at that instant is a distance b below the first, is let go. Prove that when the first body overtakes the second, the second has fallen a distance, $\frac{b^2}{4a}$.

7. State the second law of motion, and deduce from it the fundamental formula of dynamics. 9

If a gramme weight hanging over a smooth pulley pulls a weight of 1 kilogramme over a smooth horizontal table, find approximately the velocity of the system after the gramme weight has fallen through 1 metre.

8. Find the tension and inclination to the vertical of the string in a conical pendulum. 1

A particle lies within a fine frictionless circular tube of radius a which is set spinning round its vertical diameter with angular velocity ω. Prove that if ω^2 exceeds $\frac{g}{a}$, the particle will be in equilibrium at a point of the tube radius through which is not vertical.

9. Find the directions in which a body may be projected with a given velocity from a given point so as to pass through another given point. 12

A body of mass m is projected with velocity v at an angle of elevation α. At the highest point of its path it strikes and carries away with it another body of mass M which had rested on a pillar. Find where the combined body falls.

10. Define the coefficient of elasticity. Obtain the velocities of two smooth spheres after direct impact. 1

A ball of mass m strikes another of mass km at rest. The direction of motion makes an angle of 30° with the line of centres at the time of collision. Find the relation between k and e, the coefficient of restitution, in order that the first ball may go off at right angles to its original direction. What restriction is there on e that this may be possible?

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY—PAPER I.

N.B.—Equations and neat diagrams must be given whenever possible.

1. Give an account of the ionic theory and illustrate your answer by showing clearly what occurs when a solution of Potassium Sulphate is electrolyzed. Describe clearly Faraday's laws of electrolysis and the ionic explanation of them. 1

2. Give examples of normal salts that in aqueous solution re-act (*a*) neutral, (*b*) acid, (*c*) alkalin, respectively towards litmus. 10

Discuss fully the cause of these differences in behaviour.

3. What do you understand by *allotropy*? Describe the allotropic varieties of sulphur, and explain how each form may be obtained from roll brimstone. How would you show that each of these is a modification of one and the same element? 10

4. What happens when chlorine gas is passed through aqueous solutions of the following:— 10

(*a*) sodium hydroxide, (*b*) ammonia, (*c*) ferrous sulphate, (*d*) sodium sulphite, (*e*) sulphur dioxide?

5. Describe the appearances presented and the reactions which ensue when sodium hydroxide solution is added to cold aqueous solutions of:— 10

(*a*) Alum, (*b*) copper sulphate, (*c*) mercuric chloride, (*d*) ferrous sulphate, (*e*) zinc sulphate, (*f*) cadmium nitrate.

6. Write a short account of the manufacture of coal gas and its purification. Explain the nature of the chemical actions that occur in the various parts of the plant. 10

7. How is aluminium prepared? Give its uses. Give a short account of the various alums. 10

8. A compound of nickel was found on analysis to contain: nickel, 34·1 per cent.; carbon, 28·2 per cent.; and oxygen, 37·8 per cent. 10

Find its formula.

[Ni = 58; C = 12; O = 16.]

TUESDAY, 19TH NOVEMBER.

[2-30 P. M. TO 5-30 P. M.]

CHEMISTRY—PAPER II.

N.B.—Equations and neat diagrams must be given whenever possible.

1. Give an account of the molecular hypothesis and show how it allows the molecular weight of a gas to be determined by merely weighing a known volume of the gas. What are the reasons which make it necessary to suppose that the molecule of an element as a rule contains two atoms? Give an account of any exceptions to this principle, with which you may be acquainted. 10

2. Describe the preparation and properties of as many peroxides as you know and indicate the uses to which any of them may be put in practical life. 10

3. Describe clearly what occurs when solutions of the following substances are added to a solution of silver Nitrate (*a*) Caustic soda, (*b*) Potassium Iodide, (*c*) ammonia, (*d*) Phosphine, (*e*) Sodium Thiosulphate. 10

4. What changes ensue when the following substances are heated with full exposure to the air: (*a*) crystallised ferrous sulphate, (*b*) potassium nitrate, (*c*) lead nitrate, (*d*) ammonium nitrate, (*e*) zinc carbonate, (*f*) common sodium phosphate, (*g*) borax, (*h*) iron pyrites? 10

5. How would *you* obtain (a) potassium, (b) chlorine, (c) oxygen, from potassium chlorate? 10

How would *you* prepare (a) hydrogen, (b) nitrogen, from ammonia?

6. How are boric acid and borax obtained on the large scale? Give an account of their appearances, properties and uses. With what other elements is boron classed and what are the reasons for your answer? 10

7. Give an account of the ores and manufacture of (a) Tin, (b) Mercury. What salts of these metals are of technical importance and for what are they used? With what other elements is each of these metals most closely related and what is the nature of the relation? 10

8. Explain clearly the meaning of the word equivalent and give examples illustrating your answer. 10

1·298 gm of a metal dissolve in dilute acid and yield 461 cc. of dry hydrogen at 17°C. and 762 mm. pressure. Calculate the equivalent of the metal.

What else would have to be done in order to determine the atomic weight of the metal?

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5 30 P.M.]

PHYSICS—PAPER I.

N.B.—Draw neat diagrams wherever possible.

1. Two bodies start together from the top of a smooth inclined plane One moves along the plane and the other moves vertically downwards. Compare the spaces passed over by these in time T after the start. 12

Explain how you can use a smooth inclined plane to find the force of gravity at a place.

2. Describe the Fleuss or Geryk pump and explain its working. What are its special advantages? 10

3. A circular disc, having equidistant holes bored near its edge so as to be perpendicular to the plane of the disc, is spun horizontally and an air jet is made to play upon the holes as the plate is spinning. Explain what happens. 12

The interval between two notes is a major fourth and the pitch of the lower note is 384. Find the pitch of the other. Take the higher note as the tonic and find the pitch of the corresponding dominant and sub dominant.

4. Describe Kundt's method of determining the velocity of sound in gases. 12

Can you explain why the powder collects in different heaps in his apparatus?

5. Show that the absorbing and radiating powers of a substance are equal. 6

6. Explain how you will find the specific heat of a gas at constant volume. 6

7. Explain the difference between saturated and unsaturated vapours and show how the weight of a given volume of moist air can be found. 10

8. Explain what is meant by the efficiency of a heat engine. Define Indicated horse-power and Brake horse-power. How are these determined? 12

THURSDAY, 21ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER II.

1. Give a short sketch of Foucault's method for measuring the velocity of light. 14

Find the focal length of a double convex lens when the radius of curvature of the two faces is 2 cms and the refractive index of the glass $\mu = 1 \cdot 5$.

2. Describe and explain polarisation of light. State the relation which exists between the angle of polarisation and the angle of refraction. Find the relation between the index of refraction and the critical angle. 14

3. Prove that the force between two magnetic poles varies inversely as the square of the distance between the poles. 12

The horizontal and vertical components of the earth's magnetic field in Bombay are 0·368 and 0·159 respectively. Hence find the dip in Bombay.

4. Prove that the work done in charging a Leyden jar is given by the equation 12

$$w = \frac{1}{2} \frac{s}{4\pi t} v^2$$

where s = surface of the coating of the jar.

v = potential of the charge.

t = reduced thickness of the insulator.

A spherical conductor of radius 10 cms has a charge of 100 electrostatic units. Find (*a*) the potential of the charge, (*b*) the electric density on the surface, (*c*) the electric density as the centre.

5. How can the velocity of electricity in a conductor be measured by the discharge of a Leyden battery? 12

Find the potential of the charge on the sphere in question 4, example, when the sphere is completely surrounded by a second concentric sphere of radius 12 cms.

6. Deduce Ohm's law for the strength of a current from the analogy between the flow of electricity and the flow of heat. 12

Let n be the number of cells of a battery, r the internal resistance of each cell R the external resistance. Prove that if $r = R$ we get the same current whether we connect the cells in series or in parallel.

7. Describe and explain the damping effect of a copper disc on a magnetic needle oscillating over the disc. 6

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

BOTANY—PAPER I.

N.B.—Illustrate your answers by diagrams.

1. Describe the various types of branching met with in plants. 14

2. Describe fully with the aid of a diagram the microscopic structure of an anther, and mention the different ways in which an anther dehisces to liberate the pollen grains. 14

3. Describe the different kinds of indefinite inflorescence (*a*) with an elongated primary axis, and (*b*) with a dilated fleshy axis, giving examples. 14

4. Classify and describe fully the following fruits, giving an example of each :— 12

Capsule, follicle, drupe, caryopsis, syconus, sorosis.

5. Describe the various methods in which plants reproduce themselves asexually, giving examples. 14

6. Give the general characters of the natural orders Malvaceæ, Asclepiadaceæ, Liliaceæ, and name a few plants belonging to each. 12

THURSDAY, 21ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

BOTANY—PAPER II.

N.B.—Illustrate your answers by diagrams.

1. Give the microscopic structure, the composition, and the physical and chemical characters of starch. 14

2. Describe the structure and development of a sieve-tube. Where does it occur and what is its probable function? 12

3. Describe fully the microscopic structure of the stem of an old dicotyledonous plant, and trace the longitudinal course of the vascular bundles in it, explaining fully the significance of the terms common and cauline bundles. 14

4. Give an account of the process of absorption of water from the soil by the root. In what essential respects does this process differ from the physical process of osmosis? 14

5. Describe the phenomenon of respiration in plants. 12

6. Give an account of the structure and life-history of Mucor. What is its place in the vegetable kingdom? 14

MONDAY, 18TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

ZOOLOGY—PAPER I.

N.B.—Answers to be illustrated by diagrams.

1. Compare and contrast the circulatory systems of the Lobster and the Earthworm. 10

2. Describe the microscopic structure of a striated muscle, and compare it with that of a non-striated one. 10

3. Describe the secretory organs of an Earthworm. 10

4. Give a diagrammatic representation of the transverse section of the thorax of a Crayfish. 10

5. Give an account of the various methods of reproduction of Vorticella. 10

6. What do you know of the microscopic structure of a typical animal cell? 10

7. Name and describe the parts and organs that are found in connection with the head of a Cockroach. 10

8. Give a description of the reproductive organs of a typical Gasteropod. 10

TUESDAY, 19TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

ZOOLOGY—PAPER II.

N.B.—Answers to be illustrated by diagrams.

1. Write what you know of the urino-genital organs of the Dogfish. 10

2. What is cœlom? Compare the cœlomic cavities of an Earthworm, Lobster, and Frog. 10

3. State the main features distinguishing the Reptilian skull from that of an Amphibian. 10

4. Give an account of the urogenital organs of the male Frog. 10

5. Describe the alimentary canal of a graminivorous Bird. 10

6. Compare the brain of a Bird with that of a Rabbit. 10

7. Give a short account of the arterial arches of Amphibians, Birds, and Mammals. 10

8. Describe the various kinds of epithelial tissue and mention where they are found in the animal body. 10

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER I.

(Gibbon.)

N.B.—Not more than six questions to be attempted.

Equal marks are assigned to each question.

1. Describe the events which led to the accession of Septimius Severus and form an estimate of him as warrior and statesman.

2. "His (Aurelian's) reign lasted only four years and nine months, but every moment of that short period was filled by some memorable achievement." Illustrate the statement as fully as you can.

3. State and criticise the position taken up by Gibbon in regard to the causes of the Christian persecutions, and describe the attitude of Nero, Trajan and Diocletian towards the new faith.

4. What do you think of Julian the Apostate as a man, a ruler and a philosopher?

5. Write a note on the origin and early history of the Huns and relate the exploits of their terrible chief Attila.

6. Tell the story of the conquest of Africa by the Vandals *or* of its reconquest by Belisarius.

7. Write short notes on any three of the following:—

The Empress Theodora, Archbishop Ambrose of Milan, John Chrysostom, Procopius the historian, Bœthius.

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER II.

(*Gibbon.*)

N.B.—Not more than six questions are to be attempted.

(Equal marks are assigned to each question.)

1. What was the iconoclastic controversy? How did it materially affect the decline and fall of the Roman Empire?

2. Describe and account for the rapid expansion of the Saracen power from the death of Mohammed to the battle of Tours.

3. (*a*) Explain the importance of the pontificate of Gregory VII.

(*b*) What was the political heresy of Arnold of Brescia?

4. Trace the influence of the Crusades (*a*) on the Papacy, (*b*) on Society, (*c*) on the intellectual life of Europe.

5. Give an account of the career and character of Robert Guiscard.

6. (*a*) What were the services rendered by Nicholas V. and Cosmo de Medici to the revival of Greek learning in the western world?

(*b*) Describe the events known as the Poetical Coronation of Petrarch.

7. How do you account for the protracted existence of the Eastern Empire?

8. Write brief notes on the following:—

(*a*) The Hanseatic League.
(*b*) Charles Martel.
(*c*) The Janizaries.
(*d*) Haroon-al-Rasheed.

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER III.

(*Bryce.*)

N.B.—Only *six* questions are to be attempted. Equal marks are assigned to each question.

1. What was the attitude of the Teutonic invaders towards the Empire a the Church, and how do you account for it?

2. Summarise the events which led to the election of Charlemagne Emperor and discuss the theories of contemporary and later medieval writ regarding the same event.

3. Sketch the career of Frederick Barbarossa pointing out in particular the causes of his wars with the popes and the Italian cities.

4. Give an account of the mediæval ideas that made the continued existence of the Empire appear a matter of necessity.

5. By what successive steps did the seven Electors acquire the exclusive right of choosing the emperor?

6. Show how the peculiarities of the German constitution were the result of the connection between the Empire and the German kingdom.

7. Examine the political influence of the Reformation on the Empire.

8. Write brief notes on the Concordat of Worms and Dante's political views.

THURSDAY, 21st NOVEMBER.

[2-30 P.M. to 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER IV.

(*Guizot.*)

N.B.—Equal marks are assigned to each question.

1. Describe the chief elements which the Teutons contributed to civilisation. Discuss the relative importance of the Classical and Teutonic elements in the history of European civilisation.

2. What was the social and political condition of Europe in the 5th century? State what you know of the attempts at organisation in France in the 8th and 9th centuries.

3. Discuss the influence of the Church in the Middle Ages upon European civilisation.

4. Give an account of the condition of the towns after the fall of the Western Empire, and of the circumstances which led to the revival of town life in the 11th and 12th centuries.

5. "Diplomacy in Europe dates from the fifteenth century." Illustrate this remark in the light of the reign of Louis XI of France.

6. Describe and comment upon Guizot's view of the French Monarchy under Louis XIV.

V.

INTERMEDIATE SCIENCE EXAMINATION.

EXAMINERS.

The Rev. J. DEVINE, S.J.	In English.
The Rev. JOHN MCKENZIE, M.A.	
R. P. PARANJPYE, B.Sc., M.A.	In Mathematics.
JOHN MACLEAN, M.A., B.Sc.	
CHAS. J. J. FOX, B.Sc., PH.D.	In Chemistry.
ALEX. R. NORMAND, M.A., B.Sc.	
K. R. KANITKAR, M.A., B.Sc.	In Physics.
The Rev. A. STEICHEN, S.J.	
A. M. MASANI, M.A., B.Sc.	In Biology.
V. N. HATE, B.Sc.	
The Rev. J. ASSMUTH, S.J.	
J. P. MULLAN, M.A.	

WEDNESDAY, 30TH OCTOBER.

[10-30 A.M. TO 1-30 P.M.]

ENGLISH (*Text Books*).

[*The same as that set for the Intermediate Arts Examination, see pages 59 and 60.*]

FRIDAY, 1ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ENGLISH (*Composition*).

[*The same as that set for the Intermediate Arts Examination, see page 61.*]

WEDNESDAY, 30TH OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

TRIGONOMETRY.

[*The same as that set for the Intermediate Arts Examination, see pages 78—81.*]

FRIDAY, 1ST NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

STATICS.

N. B.—Arrange your answers in two sections.

SECTION I.

1. Show how to resolve a force into components along two given directions, and use Lami's Theorem to get formulæ for these components. What horizontal force is required to keep a body at rest on a smooth inclined plane? 10

A sphere of radius a and weight W is attached to a point in a smooth vertical wall by a string of length b; find the tension of the string and the pressure on the wall.

2. Enunciate the Polygon of Forces, and show how it may be used to find the resultant of a number of concurrent forces. Explain also the method of getting the resultant by considering the resolved parts of the forces in two directions at right angles. 10

ABC is an equilateral triangle in which AD is perpendicular to BC. Forces acting at a point are represented in magnitude and direction by $2AD$, $3BA$, CB, AC. Find the magnitude and direction of their resultant by both methods mentioned above.

3. Define a couple. What is the characteristic property of couples? Prove that a couple and a force acting in the same plane are equivalent to a single force. 9

Three forces act along the sides of a triangular lamina and are proportional to the sides along which they act: find the magnitude of their resultant.

4. Prove that the moment of the resultant of two unlike parallel forces about any point is equal to the sum of the moments of the forces about that point. What is meant by the centre of a system of parallel forces? 9

A small steelyard 20″ long is graduated for 18″ from one end so as to weigh up to 16 lbs. If the weights are hung from the other end and the running weight is 1 lb., find the position of the fulcrum. Where is the centre of the weights when the steelyard is fully loaded, and also when it registers 12 lbs.?

5. Prove that if the sums of the moments of any system of forces in a plane about three points not in the same straight line are zero, the forces are in equilibrium. 10

A small ring of weight W slides on a smooth vertical hoop. A string of a length three-quarters of the diameter of the hoop has one end fastened to the ring and the other to the highest point of the hoop. When the string is tight find its tension.

SECTION II.

6. Prove that the weight of a triangular lamina is equivalent to three weights at its corners equal to one-third of the weight of the lamina. 8

Find the C.G. of equal masses at five of the vertices of a regular hexagon.

7. If the C.G. of a complete body is known and also the C.G. of a portion removed, how is the C.G. of the remainder determined? 13

$ABCD$ is a uniform square lamina: E and F are the mid-points of AB and BC. The corner EBF of the square is now cut off, and the lamina suspended from the angular point A. Find the tangent of the angle which AD makes with the vertical in the position of equilibrium.

8. A weight W is supported on an inclined plane which makes an angle α with the horizon by a force acting at an angle β to the plane. Find the greatest and least possible values of this force and show that their difference is 3

$$2W\ \frac{\cos(\alpha + \beta) \sin 2\lambda}{\cos 2\beta + \cos 2\lambda},$$

where λ is the angle of friction.

9. Find the relation between the power and the weight in the first system of pulleys with n heavy pulleys. 12

A man of weight 140 lbs. supports himself in a seat of 4 lbs. weight suspended from two moveable pulleys of 2 lbs. weight each. With what force must he pull the rope passing over the fixed pulley?

10. What are the essentials of a good balance? State how these may be secured. If a balance has unequal arms, how may the true weight of a body be found? 11

A shopkeeper uses a balance with unequal arms a and b. If he weighs out two apparent weights W of an article, using first one pan and then the other for the weights, find how much he gains or loses.

THURSDAY, 31ST OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY—PAPER I.

N.B.—Equations and diagrams to be given where possible.

1. What is the effect of adding strong sulphuric acid to (*a*) potassium perchlorate, (*b*) potassium chlorate, (*c*) potassium iodide, (*d*) potassium chloride, (*e*) potassium bichromate? Give equations. 12

2. Why is the formula P_4O_6 given to phosphorus trioxide? Discuss the cases of any other instances with which you may be acquainted, similarly involving the use of formulæ representing some multiple of the simplest possible molecular weight, in each case. 13

3. Describe two methods of preparing sulphur dioxide. What is the action of sulphur dioxide on aqueous solutions of chlorine, iodine and sulphuretted hydrogen? 12

4. What are the common natural sources of bromine and iodine and how are these elements extracted? 13

Explain why their hydrogen compounds cannot be obtained in the pure state by the method used to obtain hydrochloric acid.

5. By the action of arsenious oxide on strong nitric acid a deep brown gas is produced which gives nitrites when dissolved in ice cold alkalies and with air-free cold water nitrous acid. The residue left after the action of the acid on the arsenious acid gives sodium arsenate when neutralized by sodium carbonate and evaporated to dryness. 13

Discuss how these facts may be combined together to form an equation to represent the reaction.

6. Give an account of the preparation and properties of the element silicon and of its halogen compounds. With what other elements is silicon classed and what are the reasons for that classification? 12

7. What is the raw material from which potassium salts are usually obtained? Describe how potassium carbonate, caustic potash and potassium nitrate are obtained from it commercially. 12

8. 3·000 grams of magnesite ($MgCO_3$) were added to 5 cc. of dilute sulphuric acid: after the action had ceased 0·480 gram magnesite was left undissolved; calculate the number of grams of H_2SO_4 per litre of the dilute acid. 12

In this reaction what volume of CO_2 would be evolved measured at 27° C. and 750 mm.?

$$Mg = 24,\ C = 12,\ O = 16,\ H = 1,\ S = 32.$$

SATURDAY, 2ND NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY—PAPER II.

N.B.—Equations and diagrams of apparatus to be given where possible.

1. Describe the commercial preparation of bleaching powder. For what purposes is it used? What is supposed to be the composition of bleaching powder? How is the bleaching action explained? 13

What change would you expect to take place if bleaching powder were dissolved in water and the solution boiled? How would you in the laboratory test the correctness of your supposition?

2. Give an account of the ores and manufacture of copper. What compounds of copper are of technical importance and for what purposes are they used? 12

How would you proceed to obtain a crystallised specimen of silver nitrate from a silver coin (alloy of silver and copper)?

3. Write a short account of the hydrolysis of salts. Choose as particular cases for discussion, salts that have been met with in your practical course. 13

4. What is the most important mineral source of tin? How is the metal obtained from that source? 12

What is the action on tin of (1) hydrochloric acid, (2) nitric acid, (3) sulphuric acid?

Explain the difference observed in the rate of rusting of (1) tin plate (iron coated with tin), (2) galvanised iron (iron coated with zinc), (3) ordinary iron.

5. For what purposes is manganese dioxide used? 13

How is potassium permanganate manufactured? What is the action of an acidified solution of potassium permanganate on a solution of ferrous sulphate?

Calculate the weight of potassium permanganate required to interact with one gram of ferrous sulphate.

6. How is ammonium sulphide solution prepared and for what purpose is it used in the laboratory? 12

What is the action of ammonium sulphide solution on solutions of (1) hydrochloric acid, (2) lead nitrate, (3) arsenious acid, (4) stannic chloride, (5) nickel sulphate?

7. Describe the preparation and uses of ferrous sulphate. 13

What change is observed when ferrous sulphate is exposed to the air for a long time? What results when the product is strongly heated?

8. Barium oxide is made by heating the nitrate from the naturally occurring carbonate. What are the least quantities of the carbonate and of nitric acid that can be used to yield 500 grams of barium oxide? 12

Ba = 137, *H* = 1, *N* = 14, *O* = 16, *C* = 12, *K* = 39, *Mn* = 55, *Fe* = 56, *S* = 32.

SATURDAY, 2ND NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER I.

1. A body is moving in a circle of radius r with a uniform velocity. It is said to possess normal acceleration. Find its value and explain how it affects the velocity of the body. 14

A coin is put near the centre of a circular piece of cardboard which is turned round in a horizontal plane by a turning wheel with uniform velocity. Trace the path of the coin on the cardboard.

2. Explain the circumstances under which a body floats in a liquid and shew under what circumstances is the equilibrium of a floating body stable. 13

A sphere of cork is attached to a cube of platinum. Under what condition can this compound body be just supported in water, it being given the S. G. of plantinum is 22·07 and that of cork is 0·24?

3. Explain what causes affect the force of gravity at different places on the surface of the Earth. 13

4. Define a musical interval, a harmonic triad and a major chord. 12

The note produced by the whistle of the locomotive of a railway train is found to be the minor sixth of that of a string stretched on a monochord. Find the pitch of the whistle when it is known that the note of the string is in unison with the major third of a tuning fork of 256 vibrations.

5. Explain how you can produce Konig's manometric flames. What is the function of the mirror used? 12

Can you prove with the help of these flames whether a given note is simple or compound?

How can you shew the presence of nodes and loops in an organ-pipe with the help of these flames?

Is there any difference between the waves produced in the air in the inside and outside of an organ-pipe when it is sounding?

6. Describe Victor Meyer's method of finding the vapour density of a liquid. Prove the formula. 12

7. How is the pressure exerted by a gas on the sides of a vessel enclosing it, accounted for on the Dynamical theory of gases? Can you prove Avogadro's law with its help? 12

8. Describe Regnault's method of determining the vapour pressure of water above and below 100° *C*. 12

MONDAY, 4TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHYSICS—PAPER II.

1. A ray of monochromatic light falls on a prism. If the refracting angle is A and the angle of incidence is i find the angle of minimum deviation of the ray. Hence find an expression for the refractive index of the prism in terms of the refracting angle and the angle of minimum deviation. 14

An object 2 cms. high is placed vertically on the principal axis of a concave mirror at a distance of 25 cms. from the centre of the mirror. The radius of curvature of the mirror is 1m. Find the nature, size and position of the image.

2. Describe the phenomenon of double refraction in a uniaxial crystal, the law of refraction and the polarisation of the two rays. 5

3. If μ denotes the coefficient of magnetic permeability of a substance and k the coefficient of magnetic susceptibility prove that 14

$$\mu = 1 + 4 \pi k.$$

Two long bar magnets of pole strengths m_1 and m_2 are placed in a straight line, their like poles being opposite each other. d is the distance between the two like poles. Find the point on the line joining the two poles where a small iron ball will remain at rest under the attraction of the two poles.

4. How is the horizontal component of the earth's magnetic force determined in absolute measure? 1

At a place A the total magnetic intensity is 0·5 and the dip is 64°: at a place B the total intensity is 0·6 and the dip is 72°. If a magnet vibrating horizontally at A makes 20 oscillations in a minute how many oscillations would it make in the same time at B?

5. Explain what is meant by an electric field, a line of force, an equipotential surface and draw the lines of force of a single charged particle, of two particles with equal and like charges and of two particles with equal but unlike charges. 14

Unit positive charge is placed at the point of intersection of the diagonals of a rectangle whose sides are 3 and 4 cms. respectively. Find the resultant force on the charge if charges $-6, +8, +10, -12$ are placed at the successive corners of the rectangle. Draw the figure.

6. A number of cells and an external resistance are given. How must the cells be arranged so that the current may be a maximum? Prove your statement. 16

The poles of a battery, whose internal resistance is equal to 2 ohms and whose E M F. is equal to 200 volts are connected by a wire. A current of 10 ampères passes through the wire. The specific resistance of the wire is 2 mikrohms, the area of the cross-section of the wire is 1 mm². Find the length of the wire.

7. What are the laws followed by two parallel electric currents acting upon one another and how are they proved? 17

The poles of a Grove's cell whose E. M. F. is 1·9 volts and internal resistance is 0·4 ohms, are connected first by means of a wire whose resistance is 3 ohms, then by means of a wire whose resistance is 30 ohms. Find the ratio of the heats produced by the currents in the two arrangements.

8. Describe the lightning conductor and its action.

THURSDAY, 31st OCTOBER.
[10-30 A.M. TO 1-30 P.M.]

BIOLOGY.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Give an account of the structure and life history of Fucus. 1

2. Describe fully the phenomenon of Carbon assimilation. 1

3. Describe fully the forms and occurrence of the Tracheal tissue. 1

4. Describe in detail the microscopic structure of a typical Angiospermous ovule before fertilization, and mention the different forms of ovules found in Angiosperms. 1

SECTION II.

5. Give a short account of the mode of feeding, growth and metabolism of Amœba. 1

6. Describe the alimentary canal of a Spiny Lobster. State the functions which the various parts of the canal perform in the digestion of food. 1

7. Describe the general structure of the heart of a Frog, and give the mechanism which ensures the passage of blood in the right direction. 1

8. Describe the structure of the ovum of Amphioxus and the mode of its segmentation. Give an account of the stages of development up to the formation of the embryo. 1

VI.

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE.

EXAMINERS.

R. P. PARANJPYE, B.Sc., M.A. ... ... JOHN MACLEAN, M.A., B.Sc.	In Mathematics.
K. R. KANITKAR, M.A., B.Sc. ... ... The Rev. A. STEICHEN, S.J.	In Physics.
CHAS. J. J. FOX, B.Sc., PH.D. ... ... ALEX. R. NORMAND, M.A., B.Sc.	In Chemistry.
V. N. HATE, B.Sc. ... ... J. P. MULLAN, M.A.	In Botany.
M. K. KANGA, M.A., B.Sc., L.M. & S. ... ... H. M. PAGE, F.I.C., F.G.S.	In Geology and Mining.
Major L. T. R. HUTCHINSON, M.D., B.C., D.P.H., D.T.M., I.M.S. ... ... R. ROW, M.D., D.Sc.	In Animal Physiology.

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ANALYTICAL GEOMETRY AND HYDROSTATICS.

[*The same as that set for the B.A. Examination, see pages 130–132.*]

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ALGEBRA, TRIGONOMETRY AND SOLID GEOMETRY.

[*The same as that set for the B.A. Examination, see pages 132 and 133.*]

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

DIFFERENTIAL AND INTEGRAL CALCULUS.

[*The same as that set for the B.A. Examination, see pages 134–136.*]

2. Describe in detail the management of the third stage of labour, giving reasons for everything you do. 15

3. Enumerate the difficulties that may arise in the course of delivery in "breech presentations". State briefly the manner in which you would deal with each one of them. 15

SECTION B.

1. What do you understand by the term albuminuria of pregnancy? Give the probable course and treatment in a case where albumin has been detected during pregnancy. 10

2. Give an account of the diagnosis and treatment of retroflexion of the uterus. 20

3. Give the treatment of— 20

either (*a*) Acute diarrhœa in an infant;

or (*b*) Broncho-pneumonia in an infant.

PART II.

EXAMINERS.

H. I. JAN MOHOMED, M.D., B.S., F.R.C.S. ... } In Surgery.
R. J. L. SLADEN, F.R.C.S. ... . }

B. E. GHASVALA, L.M. & S. .. .. } In Medical Jurisprudence, including Practical Toxicology and Hygiene.
SORAB K. NARIMAN, M.D., B.Sc., D.P.H., M.R.C.S. }

MONDAY, 2ND DECEMBER.
[10-30 A.M. TO 1-30 P.M.]

SURGERY.

N.B.—The answers to the two sections should be written in separate books.

SECTION A.

1. What signs would you be on the look-out for as indications of impending disaster during the administration of a general anæsthetic? Mention briefly how you would avert danger or deal with it when it arises. What other methods of inducing analgesia for surgical procedures do you know of? Give a brief account of the special indications for their use, their limitations, and dangers. 17

2. A patient is brought up to you in an unconscious condition, *as a result of an injury received on the head*. How would you proceed to examine the case so as to arrive at a diagnosis? Mention the immediate and subsequent treatment, laying special stress on the clinical aspects of the case, that would lead you to advise operative measures. 17

3. Give a brief account of the anatomy of the lymphatic glands of the neck, with special reference to the areas drained by them. How would you proceed to differentiate the causes of glandular enlargements in the neck? Give briefly an outline of the treatment of Tubercular glands in this region. 16

SECTION B.

4. A woman of about 35 complains of a small lump in her breast, which has been noticed for about 3 months. What examination would you conduct, and what points would you rely on to arrive at a conclusion as to the nature of the swelling? Sketch briefly the treatment of such a case if you were of the opinion that it was Carcinomatous. 17

5. How would you examine a patient with retention of urine, so as to arrive at a diagnosis of the cause? What steps would you take to relieve the condition, mentioning these in the order that you would adopt them? 17

6. Describe, in detail, how you would operate (mentioning the precautions you would take) on the following abscesses:— 16

(*a*) the different varieties of Whitlow; (*b*) an Axillary abscess; (*c*) a Peritonsillar abscess; (*d*) a Retropharyngeal abscess. Mention the difficulties in the diagnosis of each of these conditions.

MONDAY, 2ND DECEMBER.

[2-30 P.M. TO 5-30 P.M.]

MEDICAL JURISPRUDENCE AND HYGIENE.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Describe the symptoms, post mortem appearances and treatment of poisoning by 12

(1) Chloral Hydrate,

(2) Strychnine.

2. Mention the three primary causes of death, and describe the symptoms and post mortem appearances of any *one* of them. 12

3. Define the following terms:— 13

Delusion; mania; melancholia; paranoia; lucid interval; idiocy; cretinism and kleptomania.

4. Mention the different methods employed for producing criminal abortion. How would you proceed to examine a case where this had occurred? 13

SECTION II.

5. In case of a man, woman and child meeting their death by same accident, what would the presumption of survivorship be in (*a*) drowning, (*b*) starvation, and (*c*) burning? State your reasons in each case. 10

6. A case of small-pox is notified from a crowded district of a town. State in detail the steps you would take to prevent extension of the disease. 15

7. Discuss the question of the part played by the sub-soil water in the production of certain diseases. Name such diseases and state the rationale of their production. 15

8. What amount of cubic space and of floor space is required for each patient in (*a*) a general hospital, and (*b*) an infectious diseases hospital? What are the dangers of overcrowding in such hospitals? 10

XIII.

FIRST OR THE PRELIMINARY SCIENTIFIC EXAMINATION.

EXAMINERS.

Major W. H. DICKINSON, M.B., CH.B., F.I.C., I.M.S. A. K. TURNER, L.M. & S.	In Chemistry.
T. D. VELANKAR, B.Sc., L.M. & S. ... B. P. KARANI, B.A., L.M. & S.	In Biology.
D. R. BARDI, L.M. & S., F.R.C.S.I. ... L. L. JOSHI, B.Sc., M.D., D.T.M.	In Physics.

WEDNESDAY, 10TH APRIL.

[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY.

SECTION I.

1. Explain in detail how Grape Sugar ($C_6H_{12}O_6$) may be converted into Alcohol (C_2H_6O). 15

2. Give the occurrence, manufacture, and properties of Phosphorus. 12

3. What grounds are there for stating that Potassium is a metal? 13

4. A volume of Pentane measures exactly 1,487 c.cms. at a temperature of plus 273 degrees Centigrade, the barometer standing at 760 m.ms. of Mercury. What will the volume be at a temperature of minus 273 degrees Centigrade? 10

SECTION II.

5. How may pure water be prepared from sea-water? 10

Sketch a diagram of the apparatus, and describe the process.

What becomes of the solutions of Carbonates thrown into the sea by rivers?

6. How is Olefiant Gas prepared? Mention the distinguishing characters of this compound. By what means could you prove that this gas contains twice as much Carbon as an equal bulk of Marsh Gas? 15

7. How is the metal Zinc found in Nature? Describe its preparation, properties, and uses in the Arts. Name its most common salts and oxides, and show how they can be prepared. Give tests for the presence of Zinc in a simple solution. 15

8. Complete the following equations :— 10

$2Ag + 2H_2SO_4 =$

$3Ag + 4HNO_3 =$

$3Pb + 8HNO_3 =$

$6Hg + 8HNO_3 =$

$3Hg + 8HNO_3 =$

$Hg_2(NO_3)_2 + H_2S =$

$2CuSO_4 + 4KI =$

$2As + 2HNO_3 + 2H_2O =$

$6As + 10HNO_3 + 4H_2O =$

$3Sn + 4HNO_3 + H_2O =$

WEDNESDAY, 10TH APRIL.

[2-30 P.M. TO 5-30 P.M.]

BIOLOGY.

N.B.—Illustrate your answers with diagrams where possible.

SECTION I.

1. Describe the life history of Mucor stolonifer. 12

2. Describe the epidermis and its appendages. 13

3. Describe the microscopic appearance of the transverse section of a leaf of a flowering plant. 12

4. Describe the functions of the flower in a flowering plant. 13

SECTION II.

5. What physiological functions are performed by a living unicellular organism? Describe one of them. 12

6. Describe the heart of the frog and compare it with that of the rabbit. Enumerate the cranial nerves of the frog. 13

7. Describe the alimentary system of the earthworm and compare it with that of the cockroach. 12

8. Describe the process of reproduction and the subsequent development to the tadpole stage in the frog. 13

THURSDAY, 11TH APRIL.

[10-30 A.M. TO 1-30 P.M.]

PHYSICS.

SECTION I.

1. Define Capillarity, Colloids, Crystalloids, Osmosis and Diffusion, giving examples of each. 10

2. Discuss the Pitch, Intensity, and Timbre or Quality of Sound. What are the causes which influence the intensity of Sound? 15

3. What is Ampere's Rule regarding the action of electric currents on magnets? 10

4. Mention the causes of Polarisation in an Electric cell. How is polarisation remedied in Daniell's cell? 15

SECTION II.

5. Describe carefully the Clinical Thermometer. How is it made and graduated? What physical property does it illustrate? 10

6. State the principle of Archimedes, and discuss its application in finding the Specific Gravity of liquids by describing a common Hydrometer. 15

7. What are Hygrometers? What is the Dew Point? How does it affect a Hygrometer? Describe Daniell's Hygrometer and its use. 15

8. Define a Lens. Mention the different types of lenses giving a rough diagram of each type. What do you mean by the Axis of a Lens, and the Principal Focus of a Lens? 10

EXAMINERS.

Major W. H. Dickinson, M.B., Ch.B., F.I.C., I. M. S.	In Chemistry.
A. K. Turner, L.M. & S.	
T. D. Velankar, B.Sc., L.M. & S.	In Biology.
B. P. Karani, B.A., L.M. & S.	
D. R. Bardi, L.M. & S., F.R.C.S.I.	In Physics.
L. L. Joshi, B.Sc., M.D., D.T.M.	

Thursday, 19th September.

[10-30 a.m. to 1-30 p.m.]

CHEMISTRY.

Section I.

1. What are the chief ores of Copper? How is the metal prepared from any one of them? How can the following salts be prepared :— 15

(a) Cuprous Chloride, (b) Cuprous Oxide, (c) Cuprous Iodide, (d) Cuprous Sulphide?

2. What is Bleaching Powder, and upon what does it value depend? How is it obtained commercially? Give its properties and uses. 15

3. Represent in equations the action of the following upon one another :— 10

(a) Ammonium Carbonate and Sulphuric Acid.

(b) Borax and Sulphuric Acid.

(c) Sodium Thiosulphate and Iodine.

(d) Bichromate of Potash and Sulphuric Acid.

(e) Permanganate of Potash and Sulphuric Acid.

4. 500 ccms. of Chlorine are measured at 27° C. and 750 mms. pressure. What will the volume be at 77° C. and 1,000 mms. pressure? 10

Section II.

5. Contrast the Physical and Chemical properties of the Oxides of Carbon. 10

6. What is the difference between an Amalgam and an Alloy? 10

Give as many examples of each as you can.

7. Give an account of the manufacture of Benzene, and mention some of the more important derivatives obtained from that substance. 15

8. What is a Glucoside? Describe Salicin and give its Graphic Formula. 15

THURSDAY, 19TH SEPTEMBER.
[2-30 P.M. TO 5-30 P.M.]

BIOLOGY.

SECTION I.

1. Describe the structure and growth of a vegetable cell. 10

2. Describe the life history of Mucor stolonifer. 15

3. Describe the microscopic appearance of a transverse section of the leaf a flowering plant. 13

4. Describe the histological structure of the epidermis of a leaf. 12

SECTION II.

5. Describe the stomach of the lobster with the special ossicular skeleton und in it. 12

6. Compare the reproductive organs of the hydra with those of the arthworm. 12

7. Describe the urinogenital system of the frog. 13

8 Describe the heart of the frog and compare it with that of the rabbit. 13

FRIDAY, 20TH SEPTEMBER.
[10-30 A M. TO 1-30 P M.]

PHYSICS.

SECTION I.

1. What is Boyle's (or Marriotte's) Law? Draw a rough sketch of Boyle's tube, and describe the experiment to prove the Law. 14

2. Compare and contrast the processes of Conduction, Convection, and Radiation. Which is the better radiator, a piece of black wood or a piece of bright tin-plate? 12

3. Describe carefully the phenomenon of Boiling. What is the difference between boiling and ordinary Evaporation? What is the influence of pressure on the boiling point of a liquid? 10

4. What is refraction of light? Describe the optical construction of the Eye. 14

SECTION II.

5. Define Parallelogram of Forces, Atmospheric Pressure, Torricellian Vacuum, Saturation Pressure, and Surface Tension. 12

6. Discuss *Consonance* and *Resonance*, giving illustrations. 12

What are the conditions for the production of a clear *Echo*?

7. Describe the different methods of magnetising a bar of steel. Which method in your opinion gives the most satisfactory results? 12

8. Mention a few experiments to prove that when an insulated conductor is charged with electricity, the charge occupies the surface of the conductor only. 14

XIV.

SECOND OR INTERMEDIATE EXAMINATION FOR THE DEGREE OF M.B., B.S.

EXAMINERS.

Major T. S. NOVIS, F.R.C.S., I. M. S. ... Captain J. MORISON, M.B., CH.B., I. M. S. ...	In Anatomy.
Major L. T. ROSE-HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I. M. S. B. L. GONSALVES, L.M. & S.	In Physiology and Histology.
E. MOSES, M.D. ... ... Captain R. F. STEEL, M.B., CH.B., I.M.S.	In Materia Medica.

WEDNESDAY, 10TH APRIL.

[10-30 A.M. TO 1-30 P.M.]

ANATOMY.

SECTION I.

1. Describe the course and relations of the cœliac axis and its branches. 20

2. Describe the muscles of the larynx, giving their attachments, their nerve supplies and their actions. 20

3. Describe the posterior interosseous nerve. 10

SECTION II.

4. Describe the origins, insertions and nerve supplies of the quadratus lumborum, the sartorius, the flexor profundus digitorum and the longus colli. 16

5. Describe the ankle-joint and enumerate the structures surrounding the joint. 17

6. Describe the refracting media of the eyeball. Indicate briefly how they are developed. 17

WEDNESDAY, 10TH APRIL.

[2-30 P.M. TO 5-30 P.M.]

PHYSIOLOGY AND HISTOLOGY.

SECTION A.

1. Give an account of the fate of Hæmoglobin in the body. Under what circumstances may hæmolysis occur and to what practical use has this knowledge been applied?

ence is the existence of a vaso-motor center based? 15
f its functions and mode of action.

rawings the histological structure of the small intes- 15
ecretion of the small intestine influence the process of

SECTION B.

uro-muscular mechanism of the pupil. What are 20
ris?

he development of the epiblast, mesoblast and hypo- 15
various structures formed from each?

inute structure of the Cerebellum. What are its 15

THURSDAY, 11TH APRIL.

[10-30 A.M. TO 1-30 P.M.]

ERIA MEDICA AND PHARMACOLOGY.

SECTION A.

siological action and therapeutical uses of Alcohol. 20
Alcohol as a Food and mention the symptoms that will
nistration in cases of fever.

thelmintics? How do they act? Enumerate the 15
mintics with their doses and classify them according
hich they act.

on for an Anthelmintic draught.

ellæ? Name the official Lamellæ and give the strength 15
f each of them.

SECTION B.

peutical uses of (1) Ipecacuanha, (2) Aloes, (3) Acid 20
tharidis.

llowing terms giving three examples of each :— 15

gogue.
c.
Escharotic.

Ecbolic.
Emulsion.

intments? Mention the fatty bases that are used in 15
numerate the official Ointments of Mercury and give
nd uses of each.

EXAMINERS.

Major T. S. Novis, F.R.C.S., I. M. S. ... ... D. D. H. Baria, F.R.C.S.	In Anatomy.
Major L. T. Rose-Hutchinson, M.A., M.D., B.C., D.P.H., D. T.M. & H., I. M. S. M. D. D. Gilder, B.A., M.D., B.S., F.R.C.S. ...	In Physiology and Histology.
E. Moses, M.D. ... ... S. A. Banker, M.D....	In Materia Medica and Pharmacology

Thursday, 19th September.

[10-30 a.m. to 1-30 p.m.]

ANATOMY.

Section A.

1. Describe the Lateral Ventricle of the brain. 20

2. Give the course and relations of the ureters in both male and female. 15

3. Give the origin, insertion, nerve-supply, and actions of the intrinsic muscles of the Larynx. 15

Section B.

4. Describe the anterior and posterior annular ligaments of the wrist, mentioning the structures in relation to each, and giving the relative positions of these structures. 15

5. Describe fully the Anterior Clural Nerve. 20

6. Describe the Clavicle and give its development. 15

Thursday, 19th September.

[2-30 p.m. to 5-30 p.m.]

PHYSIOLOGY and HISTOLOGY.

Section A.

1. Give an account of the chemistry of nucleins and nucleoproteins and briefly indicate the importance of the substances derived from them during digestion. 18

2. How may respiration be affected by (1) changes in the blood, (2) stimulation of afferent nerves? 14

3. What physiological effects are produced on muscular and nervous tissue by each of the following substances :—atropine, muscarine, veratrine, strychnine? Describe briefly in each case how you wolud demonstrate the effects described. 18

SECTION B.

o explain the microscopic arrangement of the renal 18
art do they play in the secretion of urine?

iave been employed to study the course of the 18
cts in the central nervous system? Describe and
te matter found in the cervical spinal cord and state
unction of each.

howing the minute structure of the ovary and of 14
scribe and figure the changes that occur during the
r. Where else do similar changes occur and what

FRIDAY, 20TH SEPTEMBER.

[10-30 A.M. TO 1-30 P.M.]

RIA MEDICA AND PHARMACOLOGY.

SECTION A.

ogical actions and therapeutical uses of (i) Potassium 20
ylic, (iii) Thyroid Gland. Describe the unpleasant
times follow the administration of small doses of each

agents? How do they act? Enumerate the various 15
table and mineral. Give the doses, and preparations
en internally. Write a prescription for an astringent

Name the substances that are used as pill excipients 15
s you would attend to in selecting a pill excipient.
doses of pills containing Opium.

SECTION B.

logical action and therapeutical uses of Nux Vomica. 20
reparations, and of its Alkaloid and its preparation.

owing terms giving two examples of each: (i) Anti- 15
, (iii) Hæmatinic, (iv) Vasodilator, (v) Hypnotic.

id doses of (i) Calcium Chloride, (ii) Liquor Arsenicalis, 15
Nitroglycerine, (v) Ipecacuanha.

XV.

THIRD OR FINAL EXAMINATION FOR THE DEGREE OF M.B., B.S.

PART I.

EXAMINERS.

N. F. SURVEYOR, M.A., B.Sc., M.D., D.P.H., M.R.C.P. Lieut.-Colonel L. F. CHILDE, M.B., B.A., I. M. S. ...	In Medicine and Therapeutics.
B. E. GHASVALA, L.M. & S. ... ... Major E. F. GORDON TUCKER, M.B., B.S., M.R.C.P. I. M. S.	In Medical Jurisprudence and Mental Diseases.
Lieut.-Colonel C. H. L. MEYER, M.D., B.S., I. M. S. . R. ROW, M.D., D.Sc.	In General Pathology and Bacteriology.
Major L. T. ROSE-HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I. M. S.	In Hygiene.

MONDAY, 17TH JUNE.
[10-30 A.M. TO 1-30 P.M.]

MEDICINE AND THERAPEUTICS.

1. Give the physical signs, symptoms, and differential diagnosis of Intra-Thoracic growths. 25

2. Give an account of a case of severe cholera from start to finish, including outline of treatment at the various stages. 25

3. Give the causes of Asthma. 25

Describe an acute attack of Asthma and mention your treatment, including prescriptions.

What precautions should the patient take to prevent the recurrence of an attack?

4. Give a short account of the effects of alcohol in producing disease in the human body. Both acute and chronic alcoholic intoxication are to be included. 25

MONDAY, 17TH JUNE.
[2-30 P.M. TO 4-30 P.M.]

MEDICAL JURISPRUDENCE AND MENTAL DISEASES.

SECTION I.

1. A dead body with an incised wound on the throat is brought to you for examination. Mention the points you would note in determining whether the wound was (*a*) suicidal or homicidal, and (*b*) inflicted before or after death. 13

2. Describe the causes, symptoms, post mortem appearances, and treatment of a case of poisoning (both chronic and acute) by phosphorus. 13

3. What are the chief means of procuring criminal abortion, and what post mortem appearances would lead you to suspect that it had occurred? 12

SECTION II.

4. Give the symptoms and post mortem appearances of poisoning by prussic acid. 12

5. Describe the symptoms, pathology, and diagnosis of General Paralysis of the Insane (chronic paralytic dementia). 12

6. How would you distinguish between feigned and real insanity? 13

TUESDAY, 18TH JUNE.
[10-30 A.M. TO 12-30 P.M.]

GENERAL PATHOLOGY AND BACTERIOLOGY.

SECTION I.

1. State step by step how you would proceed to isolate and identify a pure culture of Vibrio Choleræ from the dejecta of a suspected case. Give a differential diagnosis of this bacillus from allied microbes. 20

2. Give the macroscopic and miscroscopic appearances of dysenteric ulcers: describe the morphological and other characters of the chief parasites and microbes which cause tropical dysentery. 18

SECTION II.

3. Describe the naked eye appearances and histological changes of the large white and the small red granular kidneys: give the changes in the urines in these conditions. 17

4. Give an account of the part played by Internal secretions in the development of disease in the human body. 20

TUESDAY, 18TH JUNE.
[2-30 P.M. TO 4-30 P.M.]

HYGIENE.

1. What diseases are specially caused or favoured by bad ventilation? How would you explain the injurious influences of defective ventilation? 10

2. What different methods are in common use for the preservation of perishable articles of food? 20

Describe each method briefly and indicate its influence, if any, on health.

3. Define the terms "intermittent downward filtration" and "irrigation" as applied to the disposal of sewage. What are the chief conditions essential to secure the successful working of each of these methods? 20

4. Describe exactly how you would proceed to disinfect a room of 10,000 c. ft. capacity with each of the following disinfectants:— 25

(a) Formic aldehyde.
(b) Chlorine.
(c) Sulphur dioxide.

PART II.

EXAMINERS.

Lieut.-Colonel A. STREET, M.B., F.R.C.S., I.M.S. ... } In Surgery.
B. H. NANAVATTY, L.M. & S., F.R.C.S.E., F.O.S. ... }

Major A. W. TUKE, F.R.C.S.I., D.P.H., I.M.S. ... } In Midwifery and Diseases
N. A. PURANDARE, M.D. ... ... } of Women and Children.

Major G. MCPHERSON, M.A., M.B., C.M., F.R.C.S.E., I.M.S. } In Ophthalmology.

MONDAY, 24TH JUNE.
[10-30 A.M. TO 1-30 P.M.]

SURGERY.

SECTION A.

1. Mention the ways by which fracture of the base of the skull may be caused, also the signs and symptoms by which you would diagnose the injury. State the complications which are most likely to arise and your treatment of each. 20

2. What varieties of Hernia are most frequently met with in children? Describe fully the anatomical arrangements concerned in each. How would you perform Bassini's operation for radical cure? 20

3. How would you diagnose Fracture of the Neck of the Femur? Describe the process of the formation of Callus. 10

SECTION B.

1. What are the indications for Iliac Colotomy (Littre's method)? Describe the operation. Contrast the advantages and disadvantages with those of Lumbar Colotomy. 20

2. Give the causes, symptoms and treatment of Poplitial Aneurysm. State the differential diagnosis between it and other diseases from which it must be distinguished. 15

3. Mention the causes, symptoms, and treatment of Rupture of the Urethra. 15

MONDAY, 24TH JUNE.
[2-30 P.M. TO 5-30 P.M.]

MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN.

SECTION A.

1. Mention the varieties of Pelvic contraction produced by rickets. How would you diagnose them? Discuss the treatment that you would adopt to deliver a normal child in a flat pelvis whose C. V. is 3½ inches. 20

2. Give the causes, pathological changes in the uterus, symptoms and treatment of a case of Puerperal septicæmia. 15

3. Describe the distribution of the cellular tissue of the pelvic cavity. Give the symptoms, physical signs, course and treatment of 'Puerperal parametritis'. 15

SECTION B.

4. What symptoms would lead you to suspect a Placenta Prævia? Describe what you consider the best method of treating a case (1) with instruments, (2) without instruments. 20

5. What are the various causes that may lead to— 15

   (*a*) painful menstruation;

   (*b*) a purulent discharge from the vagina;

   (*c*) Metrorrhagia?

6. What are the common causes of acute abdominal pain in children? Briefly discuss their diagnosis. 15

TUESDAY, 25TH JUNE.

[10-30 A.M. TO 12-30 P.M.]

OPHTHALMOLOGY.

1. Describe the symptoms, complications and treatment of gonorrhœal ophthalmia in the case of an adult. 15

2. Explain fully the principle on which Snellen's test types for distant central vision are constructed. 15

3. Explain the optics of distant and near vision in Emmetropia, Hypermetropia and Presbyopia. Illustrate your answer with diagrams. 15

4. Give briefly the differential diagnosis of Conjunctivitis, Iritis and acute Glaucoma. 15

5. How can you tell when a senile Cataract is ripe? What points have to be seen to before submitting a patient with ripe Cataract to an operation? 15

PART I.

EXAMINERS.

N. F. SURVEYOR, M.A., M.D., D.P.H., M.R.C.P. ... Lieut-Colonel L. F. CHILDE, M.B., B.A., I.M.S. ...	In Medicine and Therapeutics.
B. E. GHASVALA, L.M. & S. ... ... Major W. H. DICKINSON, M.B., CH.B., F.I.C., I.M.S.	In Medical Jurisprudence and Mental Diseases.
R. ROW, M.D., D.SC. ... ... Captain WILLIAM D. H. STEVENSON, M.A., M.B., CH.B., I.M.S.	In General Pathology and Bacteriology.
Major L. T. ROSE-HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I.M.S.	In Hygiene.

MONDAY, 18TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

2. Discuss the various complications which may arise in a case of Enteric Fever. What measures should be taken to prevent and treat them? 25

3. A patient complains of symptoms pointing to Intra-cranial local mischief. State how you would proceed to diagnose— 25

(*a*) The nature of the mischief.

(*b*) Its situation.

4. Describe the physical signs and symptoms of Pneumothorax. Give its causes and results. 25

MONDAY, 18TH NOVEMBER.

[2 30 P.M. TO 4-30 P.M.]

MEDICAL JURISPRUDENCE AND MENTAL DISEASES.

SECTION I.

1. Describe the symptoms, post-mortem appearances and the treatment of a case of poisoning by opium. 13

How would you distinguish the insensibility caused by opium, from that occurring from apoplexy, drunkenness, syncope and epilepsy?

2. The body of a recently born infant is found with a suspicious mark round its neck; how do you know this was produced by the cord or not, and whether it was accidental or homicidal? 12

3. Describe in detail the course and symptoms of a case of general paralysis of the insane. 12

SECTION II.

4. What is meant in Toxicology by the term *poison*? 8

Do you consider a *mechanical irritant* should be classed as a poison?

5. In what ways may bones be of use in the identification of the dead? 8

6. What antidotes would you give, as an emergency in acute cases, for the following poisons:— 12

Caustic Potash; Atropine; Corrosive sublimate;
Oxalic acid; Arsenic; Lead?

7. State the general principles to be regarded by medical men in drawing up a report on a medico-legal case. 10

TUESDAY, 19TH NOVEMBER.

[10-30 A.M. TO 12-30 P.M.]

GENERAL PATHOLOGY AND BACTERIOLOGY.

SECTION I.

1. Give an account of what is known as serum diagnosis of disease. Describe in detail how you would detect agglutinins, opsonins, and bacteriolysins in blood serum. 20

(2) Give the cultural, morphological and experimental (in animals) characters of the following microbes:— 18

(*a*) B. Pestis.

(*b*) B. Diphtheriæ.

(*c*) Pneumococcus.

SECTION II.

3. Discuss the causation of Thrombosis. 17

Describe the microscopic appearances in the different varieties of thrombi.

What are the final alterations which may occur in thrombi?

4. Give a short account of the gross pathological changes present in Tuberculosis of the Genito-urinary system of the male, with a statement of the possible factors of the causation of this disease. 20

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 4-30 P.M.]

HYGIENE.

1. Give an account of the present state of our knowledge as regards the spread of tuberculosis by foodstuffs and discuss the various preventive measures which may be adopted. 25

2. In a village where well water only is available, describe the measures necessary for the provision and maintenance of a pure water supply. 25

3. What evidence exists as to the transmission of disease by the agency of flies? Discuss this question in all its bearings. 25

PART II

EXAMINEES.

Lieut.-Colonel A. STREET, F.R.C.S., I.M.S. ... ... V N. CHITALAE-BHAJEKAR, L.M. & S., F.R.C.S.E., D.P.H.	In Surgery.
N. A. PURANDARE, M.D. ... ... S. J. MEHERHOMJI, M.D.	In Midwifery and Diseases of Women and Children.
Major G. MCPHERSON, M.A., M.B., C.M., F.R.C.S.E., I.M.S.	In Ophtalmology.

MONDAY, 25TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

SURGERY.

SECTION A.

1. How would you diagnose a case of strangulated Inguinal Hernia? How treat it? And give the details of any operation you would perform. 2

2. What are the anatomical peculiarities of the scalp? What importance in surgery has each? What complications may be associated with a scalp wound? 1

3. What is an ulcer? What are the principal varieties, and indicate the treatment of each. 1

SECTION B.

4. A person is found to be suffering from enlarged glands in the groin. What are the different causes that may produce this condition and how would you treat each?

5. Describe in detail the signs and symptoms of fracture of the Patella. How is it caused? And how would *you* treat a case?

6. How may stricture of the Urethra be caused? What are its sequelæ?

How may you treat a case of chronic stricture, and give your reasons for each line of treatment.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN.

SECTION A.

1. Give the causes, symptoms, diagnosis and treatment of 'Rupture of the Uterus'.

2. What are the symptoms of 'Torsion of the pedicle' of an Ovarian cyst? What are its dangers if untreated? Describe the operation that you would perform in such a case.

3. Give the symptoms, diagnosis, complications and treatment of a case of 'Incomplete Abortion'.

SECTION B.

4. Give the clinical history of a case of 'Infantile Paralysis': what treatment would you adopt in the early and late stages?

5. (*a*) A tumour is felt occupying the vagina: Give its differential diagnosis.

(*b*) How would you diagnose a case of Vesicular Mole?

(*c*) What are the causes of Difficulty of Micturition and of Retention of Urine in women?

6. What are the causes of obstruction of labour in Breech Presentation? How would you proceed to relieve the obstruction?

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 12-30 P.M.]

OPHTHALMOLOGY.

1. Describe the symptoms, complications and treatment of Phlyctenular Conjunctivitis.

2. Describe the complications that may occur during the operation for senile cataract by the ordinary combined method and state how you would deal with them.

3. A young man is hit on the eye by a tennis ball. The globe of the eye is not ruptured. What lesions may have resulted and briefly indicate the treatment of such.

4. What is simple hypermetropic astigmatism with the rule? Why does a person with such an error of refraction see a horizontal line more distinctly than a vertical line of equal thickness and at right angles to the horizontal line.

XVI.

BACHELOR OF HYGIENE.

EXAMINERS.

Major L. T. R. HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I.M.S.;
SORAB K. NARIMAN, M.D., B Sc., D.P.H., M.R.C.S.

THURSDAY, 28TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PART I—PAPER I.

SECTION A.

1. State and explain the law relating to the diffusion of gases. How is the composition and ventilation of the air of a room affected by gaseous diffusion? 14

2. What are the principles of building construction which in this country provide for efficient lighting, ventilation and the exclusion of heat? 18

Prepare a plan of a two-storied building suitable for the accommodation of 100 persons of the working class.

3. How would you ascertain whether a water sample had been contaminated with human excrement, and whether the contamination had been recent or not? 18

SECTION B.

1. In sewering a district what precautions would you take to prevent deposits in the sewers and to facilitate their proper cleaning? 16

Find the discharge in cubic feet per minute from a drain 6 inches in diameter, discharging half full, with a fall of 1 in 100.

2. What disease is produced in men working under increased pressure of the atmosphere? Give the principal symptoms and state what precautions should be taken to protect the health of the workmen. 16

3. Frame two physiologically adequate dietaries for the working poor of Bombay, one suitable for vegetarians, and the other for those who take a mixed diet. Give your reasons for the articles of food you recommend. What quantity of each article would be required for ten adults and what would be the approximate cost? 18

THURSDAY, 28TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PART I—PAPER II.

SECTION A.

1. Describe the usual methods of performing Widal's test for typhoid and explain the rationale of the test. Point out any fallacies that may arise and explain how errors of interpretation may be avoided. 18

2. Describe the bacteriological and chemical changes which take place during the biological treatment of sewage. What are the characters of a good sewage effluent? 18

3. Describe the construction of a Fortin's barometer and explain the method of reading the vernier. What practical information can be obtained by a barometric observation? 14

SECTION B.

1. Briefly state the cultural and morphological characters of the Meningococcus, and state how they differ from those of the Gonococcus. How would you cultivate the Gonococcus from a specimen of urethral pus? 18

2. Give an account of the life-history of (*a*) Filaria Sanguinis Hominis and (*b*) Bilharzia Hæmatobia. What symptoms do the parasites produce in man, and how would you detect their presence during life? 20

3. Explain the meaning of the following terms:— 12

(*a*) dew-point, (*b*) relative humidity, (*c*) micron, (*d*) food-calorie, (*e*) specific heat, (*f*) latent heat, (*g*) foot-ton, and (*h*) normal solution.

FRIDAY, 29TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PART II—PAPER I.

SECTION A.

1. Describe recent research work on the mode of propagation of Sleeping Sickness and indicate briefly the more important preventive measures which may be adopted. 20

2. Draw up a set of instructions for a subordinate who is about to be placed in sanitary charge of extensive temporary relief works in the mofussil. 20

SECTION B.

3. Briefly give the symptoms of Kala-Azar and state in what parts of India it is most prevalent. Give the morphological characters of the parasite, and state how you would ascertain the existence of the infection in man 20

4. What general rules as to site, structure and surroundings should guide a sanitary authority when granting an application for a license to erect a slaughter-house? 20

5. Give any one method of the preparation of Pasteur's prophylactic for Hydrophobia, and explain the principles on which this treatment depends. Cite any Indian statistics to prove the value of this treatment. 20

FRIDAY, 29TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PART II—PAPER II.

SECTION A.

1. Discuss fully the duties of a Medical Officer of Health under the Epidemic Diseases Act (Bombay), and the obligations thereby imposed upon general practitioners and the public. 20

2. State what diseases have increased, or decreased during the past 50 years. Discuss the circumstances which have led to these results and the influence of public health administration on the subject. 20

3. How far and under what circumstances is the death-rate a good test of the health of a community? What do you understand by "recorded", "standard" and "corrected" death-rates? How are the latter obtained? 20

SECTION B.

4. Give a brief summary of the chief provisions of the Factory and Workshops Act (1901) so far as they relate to the health of workmen. 20

5. How is infantile-mortality expressed? What is the present average rate for towns in Great Britain and for towns in India? What relation does it generally bear to the total mortality? 20

Calculate the infantile-mortality of a town from the following data:—

Average population	350,000
Average birth-rate	30·25
Average death-rate	27·75

One-quarter of total deaths are among children under one year.

XVII.

EXAMINATION FOR THE DEGREE OF M.D.

EXAMINERS.

BRANCH I.—MEDICINE.

Lieut.-Colonel C. H. L. MEYER, M.D., I M.S.;
Lieut.-Colonel L. F. CHILDE, M.B., B.A., I.M.S.

MONDAY, 25TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

MEDICINE—PAPER I.

1. Give an account of the Animal and Vegetable Parasites which cause diseases of the skin, and describe the lesions produced. Give the treatment in each case.

2. Describe the various manifestations of Hysteria. Discuss the causation and nature of this disease. Give methods of dealing with Hysteria.

3. Describe the part played by the Bacillus Coli Communis in the causation of disease.

MONDAY, 25TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

MEDICINE—PAPER II.

1. Discuss the results of excess and defect of the Hormones of the ductless glands on the human organism.

2. Give the causes of Headache, and discuss the differential diagnosis.

3. Give an account of the abnormal types of infection by—
    (*a*) The Bacillus Typhosus.
    (*b*) The Pneumococcus.

TUESDAY, 26TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PATHOLOGY.

1. State your views on the causation of Chronic Fibrosis.
In which parts of the body does this change occur?

2. Discuss the part played by the Pancreas in producing disease. Give the pathological evidences of disease of this organ.

3. Give a full account of the pathology of Malignant Endocarditis.
Causation and mode of infection are required.

STATE MEDICINE.

EXAMINERS.

Major L. T. ROSE-HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I.M.S.;
J. A. TURNER, M.D., D.P.H.

MONDAY, 25TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PAPER I.

1. Define and enumerate "offensive trades," and give the measures which should be adopted in each case to prevent such trades from becoming a nuisance.

2. What is meant by a "carrier" as regards the spread of infectious diseases? Give three diseases which can be spread by them and state fully what measures can be adopted for dealing with the carriers.

3. What are the duties of a health officer of a Port? What regulations are laid down as to the prevention of importation of Plague, Cholera and sleeping sickness into India by sea?

MONDAY, 25TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PAPER II.

1. Describe in detail the processes employed for determining whether the microorganism associated with Cholera is present in the evacuation of an individual.

2. Describe the usual method of determining the amount of moisture present in the air and state how the amount is expressed. Discuss the influence of humidity on health.

3. In determining the wholesomeness of a given water supply, discuss the value of—

(a) An accurate knowledge of the local conditions.

(b) A chemical analysis.

(c) A biological examination.

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PAPER III.

1. You are asked to advise the Local Sanitary Authority as to the disposal of the refuse and sewage of a rapidly growing town of 1,50,000 inhabitants in India, situated inland near a river from which it obtains its water supply. Submit a detailed scheme for approval.

2. Define "expectations of life," under what circumstances would you expect increased expectations of life to raise the economic value of a population or the reverse?

3. Prepare plans or drawings, with brief explanatory notes giving all essential details and recommendations for the following purposes :—

(*a*) The construction of a cowshed for 24 animals.

(*b*) The provision of water closets in a 3 storied building and the connection of the same to the nearest sewer.

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30.]

PAPER IV.

1. How are the measures for the control of infections diseases carried out in England? What acts and laws relating to the control of infections diseases exist in England and in Bombay? State briefly the main provisions contained in each of them.

2. Give an account of the food and Drug Act (England) and state under what sections of the Bombay Municipal Act it is possible to take action with regard to the adulteration of food. How would you proceed to take action in Bombay?

3. What are the duties of a Health Officer under the Housing of the Working classes Act (England)? What powers are given to the local sanitary authority under the Bombay Municipal Act with regard to houses unfit for human habitation? Draw attention to any points which, in your opinion, require amendmont.

EXAMIMERS.

Lieut.-Colonel M. COLLIE, M.B, C.M., I.M.S.

Major S. C. EVANS, M.B., M.CH., I.M.S.

MIDWIFERY—PAPER I.

1. What is the Chorion? Describe its development and Structure.

2. Describe the circulation in the foetus and the changes that occur after birth.

3. What are the indications for Craniotomy and Cœsarian Section. State the grounds on which you would recommend either of these operations, supposing the fœtus were alive. Describe the operation of Cœsarian Section in detail.

4. Enumerate the toxœmias of pregnancy. Discuss in detail the latest views on the Causation of Eclampsia and give an account of its Pathological Anatomy.

DISEASES OF WOMEN—PAPER II.

1. What are the varieties of Pelvic inflammations met with in women? Give the Etiology, Physical Signs and symptoms, the differential diagnosis, and treatment you would adopt in the various conditions.

2. Describe the naked eye and minute Anatomy of the Fallopian Tube.

3. Describe in detail the radical operation for Cancer of the uterus.

DISEASE OF CHILDREN—PAPER III.

1. State what you know about anterior Polio-Myelitis. What treatmet would you adopt (*a*) in the earlier stages and (*b*) when further improvement seems impossible and when certain groups of muscles in the affected limbs, are permanently paralysed whilst others are unaffected.

2. Describe the development of the rectum and anus. Enumerated the malformations met with in these parts.

3. Discuss the latest views on the use of tuberculin in diagnosis and treatment, with special reference to children.

4. Describe the different varieties of Spina bifida and give the diagnosis, prognosis, and treatment.

XVIII.

EXAMINATION FOR THE DEGREE OF MASTER OF SURGERY.

EXAMINATION.

Lieut-Colonel A. Street, M.B., F.R.C.S., I.M.S.;
Major T.S. Novis, F.R.C.S., I.M.S.

Paper I.

1. Mention the causes that lead to distension of the Gall bladder, give their differential diagnosis and appropriate treatment.

2. Discuss the Pathological conditions that lead to Spinal Deformity.

3. What dangers and complications may arise during the operation for Inguinal Hernia and how would you deal with them ?

Paper II.

1. Mention the complications and Sequelae of Otitis Media and their differential diagnosis.

2. Describe in detail the operation of Lateral Anastamosis and discuss the relative merits of Lateral v. End to End methods.

3. How would you diagnose Facture of the Neck of the Femur. Discuss the treatment under various conditions.

PATHOLOGY.

1. Describe the Pathology of cancer of the breast in its different varieties How does it spread and in what way is treatment affected by this knowledge.

2. Mention the steps of Rose's operation for removal of the Gasserian Ganglion, giving the Anatomy of the parts met with during the operation.

3. Describe the various positions of Sul-Phuric abscess, giving the most common causes of each and their appropriate treatment.

XIX.

FIRST EXAMINATION IN AGRICULTURE.

EXAMINERS.

J. B. Knight, B.Sc., M.Sc.	In Agriculture.
W. Roberts, B.Sc.	
H. K. Mehta, M.A., B.Sc.	In Physics.
Chas. J. J. Fox, B.Sc., Ph.D.	In Chemistry.
G. D. Mehta, L.Ag., B.A.	
M. K. Kanga, M.A., B.Sc., L.M. & S.	In Botany.
W. Burns, B.Sc.	
M. K. Kanga, M.A., B.Sc., L.M. & S.	In Zoology.
R. P. Paranjpye, B.Sc., M.A.	In Mathematics.

Monday, 10th March
[10 30 A.M. to 1-30 P.M.]

AGRICULTURE.

Value of each question sixteen and two-thirds marks.

1. Give the reasons why Broach and Surat black soils are superior to the black soils of the rest of the Trap area for Cotton.

2. How does Bombay rank as compared to the other Provinces as (*a*) cotton producer, (*b*) wheat producer, (*c*) rice producer?

3. Contrast the action of humus on a sandy soil to its action on a clay soil.

4. Why should we expect the Potash content of Granite soils to be less than that of soils formed from Trap?

5. Draw a map of the Bombay Presidency excluding Sind showing:—

(*a*) Areas with a rainfall over 45 inches.

(*b*) Areas with rainfall below 20 inches.

State briefly the chief differences in the agricultural practices and crops grown in the two areas.

6. What evidence is there in support of the theory that the Earth's crust was at one time in a liquid state? Give examples of:—

(*a*) Igneous and (*b*) Stratified rocks in the Bombay Presidency.

7. How would you prove that silica is not essential to the growth of wheat? What is the function of Lime in the soil?

8. Describe in detail giving the origin either

(*a*) The Goradu Soil of Gujarat.

Or

(*b*) The Dharwar Black Soil.

MONDAY, 10TH MARCH.
[2-30 P.M. TO 5-30 P.M.]

PHYSICS.

N.B.—Only eight questions to be attempted.

1. State the laws of the Pendulum, and explain how Newton proved, by pendulum experiments, that the weight of a body is proportional to its mass. 12

2. Explain the terms '*work*,' '*potential energy*,' and '*kinetic energy*.' 13

An engine is used to raise water from a river to cover 20 acres of land per day (working at the rate of 10 hours a day) to the depth of one inch. Calculate the power of the engine that is required, if the land be 60 feet above the river. Express your result in horse-power. (One cubic foot of water weighs 62 5 lbs.)

3. State and illustrate the law of transmission of pressures in liquids, and explain how it is applied in the construction of hydraulic presses. 12

4. (*a*) An alloy is composed of zinc and copper whose specific gravities are 7 and 8·9 respectively. If the alloy weighs 3,000 gms. in air and 2,600 gms. in water, find the percentage of zinc and copper in the alloy. 13

(*b*) The weight of a body is determined in water at 25°C., and again in water at 100°C. Which will be found to be greater? Give reasons for your answer.

5. Describe, and explain the action of, the air-pump. Why is it impossible to produce a perfect vacuum by its means? 13

6. Why does a small quantity of air introduced into the upper part of a barometer tube depress the mercury considerably, whilst a small portion of iron floating on the mercury does not depress it? 12

A cylindrical chamber 7 feet in height is lowered in water until the top of the chamber is 20 feet below the surface of the water. If the height of the mercury barometer, at the time, is 30 inches, how high will the water rise in the chamber? (Sp. gravity of mercury = 13·6).

7. How would you experimentally determine the relation between the pressure and temperature of a given mass of air at constant volume? 12

8. Describe the various means by which heat can be transmitted from one place to another, giving examples of each method. 12

9. What do you understand by (1) the *specific heat* of a substance, and (2) the *atomic heat* of an element? 13

100 gms. of iron heated in a furnace are quickly placed in a calorimeter which contains 150 gms. of water at 25°C. If the temperature of the water thereby rise to 63°C., calculate the temperature of the furnace, the specific heat of iron being ·112.

10. Distinguish between *saturated* and *unsaturated* vapours, and explain what you understand by the *hygrometric state* of the air. 12

How would you determine the hygrometric state of the air, if you are given a small copper vessel polished on the outside, some ice, water, and a thermometer?

11. Explain what you understand by the *mechanical equivalent of heat*, and describe a method of determining its value. 13

It has been said that practically all the energy available on the earth has been derived from the sun. How would you justify this statement for the energy supplied by the steam-engine?

TUESDAY, 11TH MARCH.

[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY.

N.B.—Answers are to be illustrated, whenever possible, by equations and neat sketches.

SECTION 1.

1. Give an account of the meaning of the Law of Combination in Multiple Proportions and illustrate your answer by examples. Describe a method for demonstrating it experimentally. 12

What is the atomic weight of a metal whose specific heat is 0·0935 and of which 0·5 gms. after being dissolved in H_2SO_4 aq. gave 0·746 gms. of the Sulphide by precipitation with Ammonium Sulphide?

2. Describe clearly what you understand by the following terms:—(*a*) Solubility, (*b*) Saturated solution, (*c*) Water of crystallisation, (*d*) Diffusion, (*e*) Dissociation. Give examples. 12

Some substances when exposed to the air increase in weight while others lose weight. Discuss three instances of each kind and explain whether the application of heat during the process might be expected to produce any effect or not.

3. How much crystalline Potassium Chlorate can be obtained from 1,000 gms. *KOH*? What volume of dry Oxygen can be obtained from 20 grs. $KClO_3$ at normal temperature and pressure and what will be its volume at 37° and 740 mms. pressure? What volume of Nitric Oxide at 0° and 760 mm. could be oxidized by this oxygen and what volume of gas would you expect to be the result? 12

4. Describe the different physical forms of the element Phosphorus and give an account of its Oxides and Oxyacids. 14

Discuss what is meant when an oxide is said to be strongly or feebly basic or acidic. What is meant by the same term when applied to a hydroxide? Do you know of any cases in which such a substance may have both acidic and basic properties?

SECTION 2.

5. What is the action of Sulphuretted Hydrogen on (*a*) Bromine Water, (*b*) Iodine, (*c*) Chromic Acid in acid solution, (*d*) Fuming Nitric Acid, (*e*) Sulphurous Acid? 12

Explain what occurs when (*a*) Water is saturated with Sulphur Dioxide, (*b*) when half of the resulting solution is neutralized with Caustic Soda, (*c*) when the neutralized solution thus obtained is mixed with the remainder of the solution, (*d*) when Iodine solution is then added. Give equations.

6. Describe what is meant by "Allotropy" and discuss as many instances of the phenomenon as you may be acquainted with. 12

Give an account of the mode of occurrence in Nature, of Carbon and the most important uses to which it is put by Man. In each case mentioned indicate what property of Carbon, chemical or physical, determines its usefulness.

7. 2·16 gms. of pure Iceland Spar on being heated strongly, gave off 53 cc. of dry CO_2, measured at 26°, and 1·21 gms. of CaO remained. From these data calculate the Molecular Weight of Carbon Dioxide. 14

8. Describe the preparation and properties of Chlorine, Bromine and Iodine and the technical manufacture of the chief compounds of each of them, which are of industrial importance. Describe the uses of the latter substances. 12

[Atomic weights:—$H = 1$; $O = 16$; $S = 32$; $Cl = 35{\cdot}5$; $K = 39$; $Ca = 40$.]

WEDNESDAY, 12TH MARCH.

[10-30 A.M. TO 1-30 P.M.]

BOTANY.

N.B.—Five questions only to be answered. Give diagrams.

Questions 1 to 3 to be written in one book, questions 4 to 7 in another.

1. Explain the terms hypogyny, perigyny, and epigyny. Which condition do you consider most advantageous and why? 20

2. Describe with examples the various forms of stem with which you are acquainted. 20

3. Describe the internal structure of a typical monocotyledonous stem, and also the internal structure of a monocotyledonous stem in which cambium occurs. 20

4. What is meristematic tissue? Where is it found in plants? Describe the different kinds of meristematic tissue. 20

5. From what sources and in what forms do green plants take their Nitrogen, and how do they make use of it? 20

6. In what ways and by what means do green plants respond to the stimulus of light? 20

7. How is starch produced, carried and stored in green plants? 20

WEDNESDAY, 12TH MARCH.

[2-30 P.M. TO 4 P.M.]

ZOOLOGY.

N.B.—Illustrate your answers by diagrams.

1. Give an account of the reproductive processes in a Hydra and compare its mode of reproduction with that of Amœba and Vorticella. 12

2. Give an account of the reproductive and excretory organs of a lobster. 13

3 Give an account of the arterial and venous systems of a frog and state how circulation of blood is carried on in that animal. 13

4. Give an account of the skeleton of the pectoral and pelvic girdles and the limbs of a frog. 12

TUESDAY, 11TH MARCH.

[2·30 P.M. TO 4 P.M.]

MATHEMATICS.

1. Express all trigonometrical ratios in terms of the tangent.

Prove the following identities .—

(1) $(\sin \alpha - \operatorname{cosec} \alpha)^2 - (\tan \alpha - \cot \alpha)^2 + (\cos \alpha - \sec \alpha)^2 = 1.$

(2) $\tan^2 30^\circ + \tan^2 45^\circ + \tan^2 60^\circ = \frac{13}{3}.$

2. A person whose eyes are 5 feet 6 inches above the ground is standing within a railway tunnel whose height is 25 feet. The elevations of the tops of the arches at its ends are 5° 37′ and 13° 22′ respectively. Find the length of the tunnel. [Tables are provided.]

3. Find the area of a triangle in the form $\sqrt{s(s-a)(s-b)(s-c)}$ and calculate the difference in the areas of a triangle whose sides are 11, 12, 13 feet and an equilateral triangle of the same perimeter.

4. The diameter of a semicircle of radius 10 feet is divided into six equal parts and ordinates are drawn at these points. The extremities of the corresponding points on the arc are joined. Find the area of the rectilineal figure thus formed and deduce the percentage error in taking this area instead of the actual semicircle. [Use can be made of tables if necessary.]

5. Explain the prismoidal formula.

A well, 30 feet deep, 5 feet in diameter at the bottom and 7 feet at the top, is to have a lining of bricks fitting close together, 9 inches thick; required approximately in tons the weight of the bricks, supposing a brick $9 \times 4\frac{1}{2} \times 3$ inches to weigh 5 lbs., neglecting the mortar required. [The given diameters are the initial diameters; the final diameters will be $3\frac{1}{2}$ and $5\frac{1}{2}$ feet respectively.]

XX.

SECOND EXAMINATION IN AGRICULTURE.

EXAMINERS.

J. B. Knight, B.Sc., M.Sc.	In Agriculture.
W. Roberts, B.Sc.	
Chas. J. J. Fox, B.Sc., Ph.D.	In Chemistry.
G. D. Mehta, L.Ag., B.A.	
M. K. Kanga, M.A., B.Sc., L.M. & S.	In Botany.
W. Burns, B.Sc.	
Ramrao S. Kasargode, L.Ag.	In Entomology.
S. R. Bhagwat, L.C.E.	In Agricultural Engineering.
D. D. Sanga, G.B.V.C.	In Veterinary Science.
N. D. Dhakmarvala, G.B.V.C.	

Monday, 10th March.
[10-30 a.m. to 1-30 p.m.]

AGRICULTURE—Paper I.

N.B.—Only five questions are to be tried.

Value of each question twenty marks.

1. State all the factors that determine the amount of energy which bullocks are required to expend in ploughing.

2. Compare and explain the reasons for any differences in the draft of—

(*a*) Western Plough, (*b*) Disc Harrow

with that of the Indian implements used for similar purposes.

3. Give the best method, and the cost per acre, of irrigating sugar-cane, where the water has to be lifted 5 feet, 15 feet, 20 feet, 40 feet and 60 feet.

4. Why is it next to impossible to do successful gardening in black cotton soil tracts?

5. Give in detail the objects aimed at in tilling land. Some soils require more tillage than others. Why?

6. When would you apply Farm Yard Manure to

(*a*) Rabi crops and (*b*) Kharif crops?

Would you advocate use of fresh or rotten manure? Give reasons.

7. Give a brief account of experiments carried out in the past with manures, and results up-to-date, in the Bombay Presidency.

8. What soils are suitable for irrigation? Is drainage always necessary along with irrigation? Give reasons.

MONDAY, 10TH MARCH.
[2-30 P.M. TO 5-30 P.M.]

AGRICULTURE—PAPER II.

N.B.—Only five questions are to be tried.

Value of each question twenty marks.

1. Point out the circumstances under which it would be wiser to choose a mixed crop than to rotate. What functions are common to both? When is rotation preferred?

2. Give a four years' cropping scheme suitable for a cultivator who owns 60 acres of land containing three two-mote wells, supposing the area to be within 15 miles of Poona and to consist of the usual varying types of cropping of the region.

3. Point out the differences in the cultivation of potatoes in the principal potato-growing parts of the Presidency. Indicate chances for improvement.

4. What are the differences in the preparation of the land for Wheat and for Cotton?

5. Why in your opinion is the soil near Manjri so suitable for Sugar-cane?

6. Compare and contrast "fallowing" and "green manuring" and state under what conditions the former is preferable to the latter.

7. Why is a heavier seed drill used for Rabi sowings than for Kharif owings? What factors regulate the depth at which seed should be sown?

8. Describe in detail, giving cost of operation and profit, etc., the cultivation of either—

(*a*) Wheat. (*b*) Potatoes.

TUESDAY, 11TH MARCH.
[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY—PAPER I.

N.B.—Answers must be illustrated, whenever possible, by equations and neat sketches.

Seven questions only are to be answered, one of which must be No. 8.

1. (*a*) What is understood by the Valency of an element? 14

Discuss the Valency of Iodine in its compounds with Hydrogen and Oxygen.

(*b*) What is the evidence for the Valency of Phosphorus?

Discuss the constitution assigned to Phosphoric Acid.

(*c*) Name some of the natural sources of Calcium Phosphate and explain in terms of the Ionic Hypothesis the action of acids upon Secondary and Tertiary Calcium Phosphates.

2. How would you prepare pure Potassium Sulphate from a sample of Kainite? How would you proceed to ascertain the purity of the salt obtained. 14

0·105 gm. of Sodium Nitrate gave 27 cc. of Nitric Oxide at 14° and 750 mm. Calculate the percentage of pure Sodium Nitrate in the sample.

3. Describe the action of strong and dilute (*a*) HCl, (*b*) HNO_3, (*c*) H_2SO_4 on (*a*) Copper, (*b*) Zinc, (*c*) Iron.

10 gms. of a pure divalent metal when dissolved in HNO_3 and the resulting nitrate decomposed by heat, yielded 12·453 gms. of the oxide. Calculate the equivalent of the metal. 14

4. Describe what happens when a solution of each of the following substances is added to a solution of Silver Nitrate:—(*a*) Caustic Soda, (*b*) Potassium Iodide, (*c*) Potassium Cyanide in excess, (*d*) Ammonia, (*e*) Sodium Sulphate, (*f*) Sulphuretted Hydrogen, (*g*) Potassium Chromate, (*h*) Phosphi[illegible] Give equations. 14

5. Describe the preparation and properties of as many peroxides as you may be acquainted with and show how their properties correspond with the composition assigned to them. 14

6. 2·165 gms. of a mineral known to contain Calcium and Barium is dissolved in dilute HCl and then precipitated with Sodium Carbonate; 1·075 gms. of a mixture of $CaCO_3$ and $BaCO_3$ is thus obtained. 0·875 gms. of this latter mixture is dissolved in dilute HCl, dilute H_2SO_4 is added and 0·685 gms. of $BaSO_4$ thus obtained. Calculate the percentages of Ba and of Ca in the original mineral. 14

7. What is the meaning and usage of the word "Alloy"? Write a short account of the approximate composition and properties of six alloys of industrial importance. 14

8. Give a description of any three of the following industrial processes:— 14

(*a*) The preparation of Potassium Chlorate.

Seven volumes of a mixture of Chlorine and Chlorine Monoxide when decomposed by heat gave nine volumes of gas. What was the percentage composition of the original mixture of gases?

(*b*) The preparation of Ammonium Sulphate. What is the cost per unit of Nitrogen in a 95 % commercial $(NH_4)_2SO_4$ at Rs. 12 per cwt. (112 lbs.)?

(*c*) The preparation of Lead from Galena.

How much metallic Mercury could be obtained by the action of 25 gms. of pure Stannous Chloride?

How would you proceed if given metallic Tin instead of the Chloride?

(*d*) The manufacture of Glass.

What is the approximate composition of (*a*) Flint Glass, (*b*) Felspar, (*c*) Porcelain, (*d*) Asbestos, (*e*) Muscovite, (*f*) Clay, (*g*) Basalt?

TUESDAY, 11TH MARCH.

[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY—PAPER II.

[The answers are to be illustrated, whenever possible, by equations and neat sketches.]

1. You are given what is said to be Butyl Alcohol. Describe all the reactions which might be carried out with the object of finding out whether it is a primary, secondary or tertiary alcohol. 12

2. How is Ethylene Glycol best prepared? It is often compared with Barium Hydroxide; give the method of preparation of the body corresponding to Barium Oxide. 12

3. (*a*) What is the action on Glycerine of (*a*) Phosphorus and Iodine, (*b*) Hydrodic Acid, (*c*) Hydrochloric Acid, (*d*) a mixture of strong Nitric and Sulphuric Acids? 12

(*b*). Describe the action of the following reagents upon Phenol:—(*a*) Caustic Soda, (*b*) Bromine, (*c*) Phosphorus pentabromide, (*d*) Nitric Acid, (*e*) Sulphuric Acid.

4. Describe the preparation of Methyl Cyanide and of Methyl Isocyanide. Give their constitutional formulæ and the reactions from which they are deduced. 12

5. Describe the preparation of glucose and fructose from cane sugar. How can the two sugars be distinguished? How is fructose obtained from glucose? 12

6. Give an account of the synthesis and constitution of the Lactic Acids. Which one exhibits optical isomerism? Give a brief account of the theory which is generally accepted as an explanation of this kind of isomerism. 12

7. Describe the preparation and properties of Aniline. How are the Nitranilines prepared? 12

What is the "Diazo" reaction? Give an account of its usefulness in the preparation of Hydrocarbons, Phenols and Halogen substitution products.

8. An organic substance obtained by the oxidation of a fat by Nitric Acid gives the following results on analysis:—The combustion of 0·150 gm. gives 0·224 gms. CO_2 and 0·067 gm. H_2O. 0·255 gms. of the substance dissolved in 100 gms. of water gives a freezing-point depression of 0·242° (Constant K for water is 19). The substance reacts with Phosphorus Oxychloride, Phosphorus Pentachloride, Acetic Anhydride, Ammonia but not with Nitric Acid. 10

From these facts deduce its Molecular Weight and Structural Formula.

WEDNESDAY, 12TH MARCH.

[10·30 A.M. TO 1·30 P.M.]

BOTANY.

N.B.—Five questions only to be answered. Give diagrams.

1. Write an essay on the Natural Order Solanaceæ, referring to the following points:— 20

(*a*) Geographical distribution of the order.
(*b*) General vegetative and floral characters.
(*c*) Any general with which you are specially acquainted.
(*d*) Plants of agricultural or horticultural importance in the order.

2. Give an account of the genus Euphorbia, and as many of its species as you are acquainted with. 20

5. Discuss the ecological conditions and factors in a ri

(1) at the beginning of the monsoon;
(2) at the end of the monsoon;
(3) after the rice crop has been harvested.

6. What are the adaptations shown by plants to c shade?

7. Write an essay on the parasitic habit in plants an how plants of this type are adapted to their mode of life.

THURSDAY, 13TH MARCH.
[12-30 P.M. TO 2 P.M.]

ENTOMOLOGY.

1. Describe the characters most useful in classifyin their natural orders, and give the characters of the or Diptera and Hemiptera.

2. What is parasitism in insects? Describe the parasitism found among them.

3. Describe the habits of the following families of in

Coccinellidæ (Ladybird beetles), Elateridæ (Wire worm lice).

4. Name the families of insects in which the soci developed. Write a short note on the social instinct of in

THURSDAY, 13TH MARCH.
[2-30 P.M. TO 4 P.M.]

AGRICULTURAL ENGINEERIN

1. Compare the advantages and disadvantages of " C "Chain and Compass Survey" when the survey operatio revenue purposes.

2. Give some examples of works on an agricultural fa will require a Level.

3. You are asked to prepare a rough estimate of co water-logged area by drainage. Explain what measurem and what other information you will collect for estimatin

4. State fully what considerations you will make if yo the Horse-Power of an Oil-Engine which is required fo irrigation purposes.

THURSDAY, 13TH MARCH.
[10-30 A.M. TO 12 NOON.]

VETERINARY SCIENCE.

1. How many bones assist in the formation of t Describe the hip joint.

2. Give the attachments and functions of the fo Temporalis, Levator humeri, Flexor metatarsi, Pectoral abdominis.

3. How would you proceed to diagnose a case of sick

4. Point out defects in the native method of sho suggest remedies.

5. Write a short-note on the accidents and disea the ox.

XXI.

EXAMINATION FOR THE DEGREE OF BACHELOR OF AGRICULTURE.

EXAMINERS.

J. B. KNIGHT, B.Sc., M.Sc.	In Agriculture.
W. ROBERTS, B.Sc.	
HAROLD H. MANN, D.Sc., M.Sc., F.I.C., F.L.S.	In Agricultural Chemistry.
M. K. KANGA, M.A., B.Sc., L.M. & S.	In Botany.
WILLIAM BURNS, B.Sc.	
RAMRAO S. KASARGOD, L.Ag.	In Entomology.
D. D. SANGA, G.B.V.C.	In Veterinary Science.
N. D. DHAKMARVALA, G B.V.C.	
HAROLD H. MANN, D.Sc., M.Sc., F.I.C., F.L.S.	In Agricultural Climatology.

MONDAY, 10TH MARCH.

[10-30 A.M TO 1-30 P.M.]

AGRICULTURE—PAPER I.

N.B.—Only five questions are to be tried.

Value of each questions twenty marks.

1. In the South Eastern part of Satara Jowari is said not to yield a good crop of grain when the preceding crop is groundnut, although fodder is produced in abundance. What may be the cause and what can be done?

2. Which of the so-called dry farming methods are suitable for Indian conditions?

3. Under what conditions and with what crops may artificial manures profitably used in India?

4. With water at a depth of 18 feet, how much sugar-cane could be irrigated with two pairs of bullocks in a season?

5. A certain soil is reported to be comparatively infertile. State clearly what steps you would propose for ascertaining the precise cause of its infertility.

6. A certain district where the rainfall in ordinary years varies between 15 inches and 25 inches has two types of soil, *viz*,

(*a*) Sandy, (*b*) Loam to heavy loam.

It is said that when rainfall is short the sandy soil gives better crops, but in years of good rainfall the loamy soils are much better. Explain clearly why?

7. Describe in detail any furrow turning plow you know. State the depth and width of furrow it generally takes and the draft in lbs. Give the weight of the plow.

8. Describe with drawings:—

(*a*) the Ramio and (*b*) Sundhio Kos.

MONDAY, 10TH MARCH.

[2-30 P.M. TO 5-30 P.M.]

AGRICULTURE—PAPER II.

N.B.—Only five questions are to be tried, including question 1.

Value of each question twenty marks.

1. What ration of oil-cake and cotton seed would be required for four Deccan bullocks drawing a CT2 plough, if they be given 21 pounds of kirbi as maintenance ration, 300 therms per mile be taken for locomotion, and the digestible nutrients in the food-stuffs taken as given below ?:—

Name of food.	Digestible Protein.	Nutrients Carbohydrates.	Fat.
Oil-cake	29·5 %	23·3 %	8 %
Cotton seed	12·5 %	30·0 %	17·3%

2. What are the essentials of a good cattle byre ?

3. Show the points of superiority of the Khillary bullock over the Deccani.

4. What opportunities does the present state of the sheep industry offer for improvement ?

5. What equipment in animals, land, buildings and utensils would be required for a dairy of 500 animals ? State the Capital necessary.

6. Describe briefly the points of a Deccani milking buffalo. In what respects is it preferable to a Jaffarabadi buffalo ?

7. What is meant by :—

(*a*) Heredity, (*b*) Inbreeding, (*c*) Mendelism ?

Give a short account of Mendelism.

8. Discuss the bearing of—

(*a*) Protein ratio and (*b*) Starch equivalent of a ration with reference to its suitability for feeding.

TUESDAY, 11TH MARCH.

[10-30 A.M. TO 1-30 P.M.]

AGRICULTURE—PAPER III.

N.B.—Only five questions are to be tried.

Value of each question twenty marks.

1. To carry on mixed farming on an area of 40 acres in Kaira District, how many permanent labourers should be kept and how much should be expended on daily labour ?

2. What gross returns could reasonably be expected during a period of ten years from 100 acres of *jirait* cultivation in the district of Ahmednagar ?

3. How would you set about ascertaining the water requirements of wheat in Sindh ?

4. What methods should be used in introducing Broach cotton into Dharwar?

5. What would be the assessment of a strip of land classed as below, if the pitch is fixed at Rs. 5, Rs. 3 and Rs. 2 for the several orders and each division is of an area of 2 acres?

1 Λ .	3 V .	5 / ..	6 ∴ ...
2 □ .	4 〰 .	3 / ..	7 X ...

6. You are asked to report on the probable yield of wheat in a tract which has suffered from lack of rain; give in detail the factors that you would take into account in estimating the yield of a particular field.

7. Discuss the advantages and disadvantages of co-operation in Agriculture.

8. What factors determine the price of labour? Why in your opinion is the price of labour rising?

TUESDAY, 11TH MARCH.

[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY OF AGRICULTURE—PAPER I.

N.B.—Six and only six questions should be answered.

1. It is commonly stated that in Western India, if groundnuts are cultivated on a plot of land for several years in succession, the land will only grow an inferior crop of grain (*e.g.*, *Jowar*) for some years afterwards. What would you consider a probable cause for this result, and how would you propose to investigate the question? 18

2. What would be the result on a black soil of the exhaustion of its organic matter? What would you think the best means of remedying the defects so produced? 16

3. If a soil were deficient in Potash, how would you expect it to be shown in a crop of potatoes grown on the land? 18

4. A sample of Sulphate of Ammonia sold for manuring is very impure. How would you determine the value of the sample, what injurious constituents would it be likely to contain, and how would you test for them? 16

5. What is meant by the 'inversion' of cane sugar? If the sugar in sugar-cane is partially inverted before the cane is reaped or after the juice is expressed, what will be the result on the quality of *gul* which can be made from the cane juice? 16

6. In the sugar-cane districts of the Deccan, there is a tendency for fish to be preferred, as a concentrated manure, to oil cake. What would you expect to be the advantages of each as a topdressing for sugar-cane, and on what constituents do these depend? 16

7. A young mango orchard grows very badly, the plants are small, and a number of them die. No insect pest or other disease is noticed. How would you investigate the cause of this condition, and in what direction would it most probably be found? 16

WEDNESDAY, 12TH MARCH.
[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY OF AGRICULTURE—PAPER II.

N.B.—Six and *only six questions* should be answered.

1. A sample of wheat bran is placed in your hands, with a statement that it has been found injurious in feeding horses. What would be the probable causes of injury and how would you detect what was the cause of injury in this particular case? 16

2. When green *jowar* fodder is cut from young plants, or from stunted plants, it is found to be very injurious to cattle How do you account for this, and what compounds are the cause of the poisoning effect? 16

3. How would you test a sample of groundnut cake for feeding for adulterations likely to be found? 16

4. What are the chemical changes which take place during the ripening of cream preparatory to the churning of butter? What are the advantages which result from these changes? 16

5. It is very common for water to be added to, or cream removed from, milk before sale. How can you detect the amount of such addition of water or removal of cream? A sample of buffalo milk has the following composition:— 18

Water	86·28 %
Fat	5·26 %
*" Solids not Fat "	8·46 %
	100·00
* Containing Ash	·81 %

Report on this sample.

6. When a sample of grain is allowed to germinate, and then dried, it is converted into malt. What chemical changes take place during this operation? How does the malt compare with the original grain as a food for animals? 16

7. Wherein lies the difference as cattle fodders between rice or wheat straw, which are extremely inferior, and oat or *jowar* straw which form good fodders? If the former were the only coarse fodders available, how would you propose to make up for the poorness of these fodders, and why would the arrangements you propose do so? 18

WEDNESDAY, 12TH MARCH.
[10-30 A.M. TO 1-30 P.M.]

BOTANY.

N.B.—Five questions only to be answered. Give diagrams.

Questions 1 to 4 to be written in one book, questions 5 to 7 in another.

1. Discuss the causes and treatment of "wilting" in plants. 20

2. Write brief notes on the fungus diseases of Jowar. 20

3. Write an essay on the morphological and physiological characters of the Peronosporeæ, mentioning all the general and species with which you are acquainted. 20

4. Describe the kinds of structure and methods of reproduction found in lichens. 20

5. Describe the internal structure of the Fern rhizome, dealing specially with the growing point. 20

6. State briefly the important contributions to the science of heredity made by De Vries. 20

7. How would you proceed to breed a variety of orange especially suitable to Konkan conditions? 20

THURSDAY, 13TH MARCH.

[12-30 P.M. TO 2 P.M.]

AGRICULTURAL ENTOMOLOGY.

1. Give the life history of Epilachna beetles and Blister beetles. Which parts of the plants are usually attacked by them and give remedies against them. 14

2. What is the composition of Lead arseniate and Rosin compound? What other substitutes can be employed in the place of these as insecticides and give their preparation. 12

3. How would you rear an aphis, a beetle and a mosquito to find out their life histories? 10

4. What are the difficulties in the way of the general adoption of spraying methods in India? How can they be made more popular and under what circumstances? 14

THURSDAY, 13TH MARCH.

[10-30 A.M. TO 12 NOON.]

VETERINARY SCIENCE.

1. How does hoven differ from impaction of rumen? Give the treatment of each. 10

2 Give the diagnostic symptoms of rinderpest and turberculosis and state what measures you would take to prevent their diffusion. 10

3. Name the signs of pregnancy in a cow. What are the functions of the "water-bag"? 10

4. Describe the method of castrating a bull by means of a hot iron. At what age would you castrate a calf? 10

5. Write a short account of how cattle poisoning is carried on in India. 10

THURSDAY, 13TH MARCH.

[2-30 P.M. TO 4 P.M.]

AGRICULTURAL CLIMATOLOGY.

N.B.—Three and *only three* questions should be answered.

1. The chief centres of wheat cultivation in India are the Punjab, the Indus Valley, the Ganges Valley, the Nerbudda Valley, and certain other parts of the Central Provinces, certain parts of Northern Gujarat, and an extension into the Deccan and as far south as Dharwar. Account, from climatic reasons, for this distribution, and indicate why wheat does not flourish extensively further to the south of the country. 16

2. Indicate how the distribution of rain during the year (as well as the quantity which falls per annum) is of great importance in determining whether the following crops can be profitably grown: (1) jute, (2) long staple cotton, (3) tobacco. 16

3. Two situations A. and B. in Western India, practically identical in regard to soil and temperature,—the latter varying from a maximum of 60° F. in December and January to a maximum of 102° F. in May—differ in respect of rainfall as follows :— 18

	A. Inches.	B. Inches.
January	......	......
February	......	......
March	......	......
April	......	......
May	0·12	0·42
June	3·62	4·68
July	4·14	14·21
August	2·46	4·16
September	12·31	2·36
October	4·14	1·12
November	0·02	......
December	......	......
	26·81	26·95

How would the methods of agriculture you would apply and the crops you would raise in these cases differ,—and why ?

4. If the South-West monsoon was very late in any year in Western India, how would it affect the kinds and varieties of crops which you would raise on a holding on black soil? The rainfall is chiefly, in any case, in the *kharif* season. 16

XXII.

EXAMINATION FOR THE DEGREE OF L.C.E.

EXAMINERS.

S. G. BURROW, B.Sc., A.R.C.S.	In Physics.
S. B. BUTANI, M A., B.Sc.	
M. K. KANGA, M.A., B.Sc., L.M. & S.	In Geology and Mining.
H. M. PAGE, F.I.C., F.G.S.	
R. S. C. BROWN, B.Sc., A.M Inst. C.E.	In Engineering and Architecture.
JOSEPH HALL, M.INST.C.E., M.I.MECH.E.	
C. J. J. FOX, B.Sc., Ph.D.	In Metallurgy.
ALEX. B. NORMAND, M.A , B.Sc., F.C.S.	
N. B. MACMILLAN, B.Sc.	In Mechanical Engineering.
TOM S. DAWSON, M.S.E.	
N. MAUGHAN, A.M.Inst.C.E.	In Sanitary Engineering.
K. S. FRAMJI, B.A., L.C.E.	

FRIDAY, 22ND NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHYSICS.

SECTION 1.

1. State the laws of reflection. 13

Indicate a method of proving them.

Two plane mirrors are inclined to each other at an angle of 90°. A ray of light (in a plane at right angles to both the mirrors) meets one of them, making with it an angle of 30°, and is reflected; it then meets the second mirror; calculate its total deviation.

You are 6 feet long; you want a plane mirror to give you an image of yourself of the same size; what should its minimum height be?

2. State, and describe an experiment to prove, the law connecting ${}_a\mu_g$ and ${}_g\mu_a$, where ${}_a\mu_g$ stands for the index of refraction from air to glass, and ${}_g\mu_a$ for the index of refraction from glass to air. 12

Suggest an experiment that may be made to prove the equation

$${}_a\mu_b \times {}_b\mu_c \times {}_c\mu_d \times \ldots\ldots \times {}_y\mu_z = {}_a\mu_z.$$

The refractive index from air to glass is 1·5, that from air to water is 1·33; calculate the index of refraction from water to glass.

3. Given the focal length of a concave lens, the distance of an object from it and the size of the object, how would you determine graphically the position and the size of the image? 12

Draw several diagrams showing the dependence of the position and the size of the image on the position of the object (of given dimensions) in the case of a convex lens.

State which of your diagrams illustrates the case of a convex lens being employed as a magnifying glass.

4. Briefly describe the experiments that may be performed to prove that the influence of the earth's magnetic field on a magnet placed in it is merely directive. 13

What inference do you draw from this fact?

The horizontal component of the intensity of the earth's magnetic field at a place is 0·8 units; a magnet whose pole strength is 25 units is suspended at that place and is free to rotate in the horizontal plane only; calculate the moment of the "directive" couple acting on it when it makes an angle of 30° with the magnetic meridian.

If the vertical component is also 0·8 units, calculate the intensity and the dip.

SECTION II.

5. Explain the principle on which Kelvin's Quadrant Electrometer works, and describe carefully how a measurement would be made with the instrument. 12

If you wished to use the instrument as a voltmeter how would you proceed to do so?

6. Describe what is meant by the polarisation of the electrodes in a simple voltaic cell. 12

Discuss the methods adopted to get rid of this effect in some of the commoner primary batteries.

7. If you are given a certain number of exactly similar cells, and you wish to send as large a current as possible through a given external resistance, what will be the ratio of the number of cells you will put in parallel to those in series. With 20 cells each of E.M.F. 1·5 volts and internal resistance 2 ohms, what is the greatest current you can send through an external resistance of 10 ohms? 13

8. Describe the action of Ruhmkorff's induction coil, explaining carefully the action of the condenser, and the way it is connected to the rest of the instrument. 13

MONDAY, 18TH NOVEMBER.

[2-0 P.M. TO 5 30 P.M.]

GEOLOGY.

SECTION I.

1. Distinguish between weathering and denudation. Classify all the agencies that are working to produce constant changes in the earth's crust. 12

2. What are "fringing reefs" and "barrier-reefs"? What are Atolls, and how has Darwin explained their origin? 12

3. Name the divisions under which all rocks may be classified. Under which of these divisions would each of the following rocks come :— 12

Trap, sandstone, laterite, marble, slate, granite, mica-schist, limestone, and gneiss?

4. What theories have been put forward as regards the condition of the earth's interior? What evidences point to the internal heat of the earth? 14

SECTION II.

5. Explain the following terms :— 10

Strike, outcrop, bar, erratics, conglomerate, dyke, laccolite.

6. Distinguish between ejected and injected rocks. What is the relation of each to the sedimentary deposits with which they occur? What is a "sill"? By what four characters can it be distinguished from a contemporaneous lava-flow? 12

7. (a) What are the "coal measures" and to what great system of strata do they belong? 14

(b) Name the chief varieties of sedimentary rocks usually found in the coal measures.

(c) State the formation usually found respectively above and below the coal measures.

(d) Do the coal measures sometimes lie on different formations? How would you account for such occurrence?

8. What is the nature of Trap rock? In what parts of India does it occur, and what is the nature of the soil produced from its disintegration? What is your opinion of the rock as a building material? 14

MONDAY, 18TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

SURVEYING.

1. Describe the four methods of surveying known to you, stating precisely the instruments required and the conditions under which they are necessary. 10

2. A reservoir is to be constructed and a contoured survey of the site is called for. Describe fully the procedure you would adopt and your reasons for the same. 15

3. Define a "well conditioned" triangle and explain its advantages for use in surveying. 8

4. Shew not more than four methods of setting out curves with which you are acquainted, drawing each accurately and shewing the necessary calculations in an orderly manner. 15

5. In a survey the base line is found to be obstructed by (a) a river, shew how you would measure the breadth of the river. 15

(b) The base line is parallel with the river, shew how you would measure the breadth and survey both banks.

(c) The base line passes through a large building, shew how you would measure the length of that portion of the base line.

6. Describe a diagonal scale and shew how it may be applied to obtain any division. 10

Explain fully the operation of a Vernier Scale.

7. Shew clearly how you will obtain the correct horizontal length when chaining up a slope of one in 35. 12

8. Describe fully an ordinary theodolite stating precisely the use of each part and the tests you would apply to ascertain whether it is in correct adjustment. 15

TUESDAY, 19TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

BRIDGES.

1. A foot bridge 6′ 0″ wide, 30′ 0″ span. Design such bridge as you would advise, having due regard to economy. 10

State the material you would use and the maximum stress to which any important portion will be subjected.

2. Design three arches forming portion of a viaduct. Spans, 25 ft. Width of roadway, 50 ft. Rise of arch, 5 ft. Piers, 25 ft. from surface to springing. Material brick. Shew the most economical use of the material. 12

3. Shew by neat sketches the various methods, with which you are acquainted, of gradually easing down centres used in construction of arches. 10

4. Draw a diagram of a steel truss 120 ft. span for carrying ordinary road traffic. 12

Shew the members in tension by thin lines and those in compression by thick or double lines.

Draw a stress diagram.

Sketch neatly one of the joints between a tension and a compression member.

5. A road crosses a railway at an angle of 50°. Draw the stone arch you would adopt shewing the plan and elevation. 12

Span 60 ft.

Height from rail to soffeit of arch 24 ft.

6. A plate girder of a bridge, 160 ft. in length, rests upon a masonry abutment. 10

Sketch neatly the arrangement you would adopt to avoid injury caused by changes of temperature.

7. Describe the method you would adopt for erecting a plate girder bridge in three spans, each 80 ft. 12

(a) If the bridge is over a railway.

(b) If over a swiftly flowing river.

8. An old bridge has been constructed of timber beams 16 ft. in length. They are on examination found to be sound but of insufficient strength for their present duty. Shew by diagram how you would treat a beam to sustain twice the load that the timber alone could sustain. 10

9. A temporary bridge is required to span 40 ft. Bamboo is the only material available. 10

Sketch the construction you would adopt to carry ordinary country carts with 15 cwt. loads on one pair of wheels.

Iron straps and bolts are available but not long rods.

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

CARPENTRY AND STRENGTH OF MATERIALS.

SECTION I.

1. Draw to a ¼″ scale Queen post Truss, 50 feet span, 12 feet 6 inches rise, covered with 1″ teak boarding and Mangalore tiles. 15

Trusses to be 10 feet apart.

Give scantlings and shew how you obtain them.

Draw to a large scale the important joints and iron straps.

2. Two rooms are to be divided by a framed partition 20 feet in length, 12 feet in height. There are two doorways, each 4 feet wide and 7 feet 6 inches in height—one is 6 feet from the end, the other 4 feet from the opposite end. 15

Draw to a scale of ½″ to one foot, figure on the scantlings and shew how you obtain them.

3. Discuss the placing of a purlin on a principal rafter and shew whether it should be set in a vertical position or at right angles to the slope of the principal rafter, stating your reasons for the same. 10

4. What are the principal tools used in woodworking? 10

What are the characteristics of each?

Are any tools special to certain trades?

Name the tools and the trades to which they are more or less peculiar.

SECTION II.

5. A bank is being cut for a roadway through loose earth. A wet stratum is met with two feet above the level of the cut, from which water is oozing. 15

A retaining wall is to be built 20 feet high with the bank above it at a natural slope.

Material, brick set in hydraulic lime mortar.

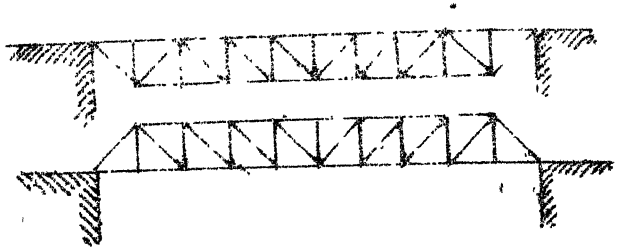
Draw a section and shew how you obtain the thickness.

6. Draw a stone arch of a bridge 80 ft. span, 10 ft. rise, to carry ordinary road traffic. 15

Shew the line of pressure and obtain this graphically, tabulate the pressures at each joint.

7. A Riding school roof of timber 100 ft. span. 10

Draw out the design to scale ¼" to one foot and shew the stresses to which the timber will be subjected and the necessary scantling to be adopted.



8. Draw each of the diagrams to as large a scale as the paper will permit, shewing in each which members are in tension and which in compression. Tension being indicated by a single line and compression by a double line. 10

Draw to scale one of the ends of the tension members.

WEDNESDAY, 20TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

RAILWAYS.

1. Discuss the relative advantages of :— 12

(a) A straight main line with many branches, and

(b) A crooked main line with few branches.

What is the main difference to be kept in view in designing main lines and branch lines in order to secure economy ?

2. What is meant by a "five degree" curve ? 12

What is the highest speed for which superelevation can be given on this curve if the line is of 5′ 6″ gauge ?

Would it be safe to exceed this speed on the curve ?

3. Give a clear account of a method of draining a cutting in soft ground, showing by neat sketches the nature of the drains on the formation, side slopes and adjacent ground. 10

4. Explain with the help of sketches how the brickwork of a length of tunnel in very soft ground is built; assume the tunnel to be for single line, and of horse-shoe section, with invert. Especially note how the work is made true to line and level, and how [illegible] 14

5. What is meant by :— 12

(*a*) Heel chair,
(*b*) Compensator for signals,
(*c*) Compensating lever for point rods,
(*d*) V crossing?

6. Make neat sketches of :— 12

(*a*) Any form of buffer in common use.
(*b*) A common form of coupling.

7. Describe the action of the automatic form of vacuum brake— 12

(*a*) When the engine is first connected to the train,
(*b*) When it is desired to apply the brakes with moderate force,
(*c*) When the force with which the brake is applied is to be reduced, but not wholly removed.

Why is this brake called "automatic"?

8. A standard broad gauge express engine has the following dimensions :— 16

Driving wheels, 6 ft. 2 in. diameter.
Cylinders, 18 in. diam., 26 in. stroke.
Weight of engine and tender, 95 tons.
Weight on coupled wheels, 35 tons.
Steam pressure, 180 lbs. per square inch.

What is the heaviest train that this engine could pull, excluding its own weight, on a line the ruling grades of which are 1 in 100? At what maximum speed could it be regularly used?

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SPECIFICATION AND ESTIMATING.

(*See Drawings.*)

1. From the accompanying plan of building take out quantities for— 40

(1) Excavation.
(2) Concrete in foundation.
(3) Brick masonry
    (*a*) in lime,
    (*b*) in cement.
(4) Rough casting in lime mortar.
(5) Cut teak wood trusses.
(6) Mangalore tiling to roof.

2. Write out specifications for— 40

(*a*) Cement concrete raft foundation.
(*b*) Brick masonry.
(*c*) Rough casting in lime mortar.
(*d*) Plastering plinth with cement mortar.
(*e*) Tile flooring on foundation of lime concrete.
(*f*) Windows as shewn.

3. Give details of labour and materials to show how you arrive at the value of Brick Masonry. 20

THURSDAY, 21ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

MINING.

SECTION I.

1. Give the name and composition of the various rocks and minerals found in the coal-seams and ironstones of the coal-measures. 12

Describe all the different kinds of coal. How is the commercial value of coal measured?

2. Describe the apparatus commonly used for deep boring, and the conditions under which it may come into use for auxiliary operations in mines. 13

3. What is a fault? Give names and sections of different kinds of faults. What is the hade of a fault, and how is it measured? Explain why the hade is of great value in mining. Give the rule used by miners with reference to the hade. 12

4. What precautions would you adopt for the prevention of accumulation of dangerous gases and of explosions? 13

What are the essential features in the construction of the Dany, Stephenson, and Clanny lamps? With what velocities of air do they become insecure?

SECTION II.

5. Explain the terms:— 10

throw, nip, balk, whim, winze, stoping, goaf, kibble.

6. Describe briefly the Post and Stall system of working coal 15

What is an air-sollar? For what reasons should the level be kept as "dead" as possible?

7. What is the usual shape of Shafts in coal mining? What is their smallest diameter? Describe the operation of timbering a shaft sunk in soft ground. 12

8. What is the object of coal washing? What are briquettes? Describe some from of coal-washing plant. Why should coal be sized before it is "jigged"? 13

THURSDAY, 21ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

METALLURGY.

1. What materials are used for crucibles for metallurgical operations? What properties should such crucibles possess and how are they manufactured? 16

2. Describe one process for extracting mercury. In what metallurgical processes is mercury used and how is it recovered? 16

How would you from a sample of mercury contaminated with zinc obtain chemically pure mercury? 16

3. Describe in some detail a process of extracting pure copper from sulphide ores containing iron as well as copper. 16

4. What are the principal lead ores and by what different methods is lead extracted from them? 16

What are the chief impurities in crude lead and how are they removed?

5. Describe carefully the chemical reactions that take place in a blast-furnace. 18

Describe the open hearth processes of steel making.

6. Discuss what takes place when molten steel (solution of carbon in iron) is (1) allowed to cool slowly, (2) suddenly chilled. 18

Explain what happens when manganese is a constituent of the molten mass.

THURSDAY, 21ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

ARCHITECTURE PAPER I.

1. What very conspicuous feature of most styles of architecture was absent in the Greek? 12

What result had this omission on the general artistic effect of the style?

2. Define and sketch:— 12

(*a*) Stylobate,
(*b*) Echinus,
(*c*) Triglyph.

3. State and sketch the differences between columns of the various Greek Orders; especially note the difference in section of the fluting, and in outline of the capitals. 16

4. What great invention in the use of materials for construction do we owe to the Romans? How did it effect their architecture? 12

5. What is entasis? How and why is it used? 12

6. Sketch in outline an example of plate tracery, and three successive developments from it, giving the approximate date of each. 12

7. Describe briefly the differences between Norman architecture and the style which immediately succeeded it. 12

8. What is the most conspicuous feature of buildings of the Perpendicular Period, and what ornaments are characteristic of it? 12

ARCHITECTURE PAPER II.

1. Describe the Indian method of roofing a square space when no stone-slabs are available of more than half the span and draw a diagram of an example shewing the plan and section to illustrate your remarks. 1

2. Draw a typical Jain pillar with capital and bracket and shew it differs from a saracenic bracket.

3. Sketch carefully an example of a column and capital from El or other cave temple you may have studied.

4. Sketch a characteristic example shewing the essentials in a Building of about A. D. 1420.

5. Draw to a large scale one of the cusped arches in the Palace at shewing precisely the method of jointing.

6. Draw in plan the special construction of the Bijapur domes an any modern local example. Describe briefly the advantages of the and wherein it differs from European architecture.

7. State whether there are any copies or imitations of the Taj if so, state where they are situated, compare them with the origi shew their relation with European Art.

THURSDAY, 21ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

MECHANICAL ENGINEERING.

N.B.—Eight questions to be answered.

Marks are the same for all questions.

1. An engine uses 12 lbs. of steam per I. H. P. per hour. Th superheated 150°*F*, and the pressure is 150 lbs. per square in The feed water temperature is 125°*F*. The total heat of stea pressure is 1222·7°*F* from 0°*F*.

Find (*a*) how many thermal units per HP. hour are supplied by the boiler and superheater?

(*b*) How many thermal units are converted per HP. hour into wo

(*c*) The thermal efficiency of the engine, if the coal is of 12500 B.T.Us. per lb. and 1·2 lbs. are used per HP. hour.

2. A condensing steam engine is running steadily with a 27 inches when the vacuum suddenly fails. Give the various re may cause this failure.

When running under proper conditions the condenser req of water per lb. of steam condensed at atmospheric pressure. W hot well temperature be when the injection water is at 75°*F*?

3. Draw any valve diagram for the following particulars.

Outside lap $1\frac{1}{2}''$, Inside lap $\frac{3}{8}''$, valve travel $5\frac{1}{2}''$ Project the dia would be obtained and point out any defects which may be appare

4. In a boiler the plates are $\frac{9}{16}''$ thick, Rivets $\frac{7}{8}''$ dia, Pitch $2\frac{1}{4}''$. that equal values are allowed in shear and tension where would the

If the boiler is 7′ 6″ dia and the safe stress is 8000 lbs. per what steam pressure can be allowed?

5. The leading screw of a lathe has two threads per inch on the mandril has 20 teeth. Arrange a train of wheels to cut thread of 18 per inch and sketch the arrangement.

6. The diameters of cylinders of a compound engine are 9″ and 18″, and the stroke is 30″, revolutions 120 per minute, steam pressure 165 lbs. absolute, terminal pressure 16½ lbs. absolute. What horse power will be developed, finding mean pressure by

$$m\,p = PX\left(\frac{1 + H}{R}\right) H\ 2{\cdot}3026$$

7. Sketch and describe some form of radial reversing gear and explain the advantages it has over the ordinary Stephenson link motion.

8. Sketch and describe some form of reversing motion for driving a planing machine by which a slow feed and quick returned may be obtained.

9. A gas engine has a cylinder 10″ dia and 20″ stroke and the mean pressure calculated from the diagram taken is 66 lbs. per square inch. The engine runs at 210 revs. per minute and during that time makes 90 explosions. What is the indicated horse power?

10. An oil engine has a Brake pulley of 4′ 6″ dia and runs at 240 revs. per minute. Sketch the arrangement of brake you would use for testing and calculate the power if the weight on one end of the strap is 116 lbs. and the spring balance on the other end shows a pull of 32 lbs.

THURSDAY, 21ST NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

HYGIENE.

N. B.—Not more than nine questions should be attempted.

1. Mention the different chemical and mechanical impurities existing in ordinary atmosphere. 9

From what sources are carbonic acid and ammonia obtained by the atmosphere? Discuss the effects of the former, on human life, when present in varying quantities in the atmosphere.

2. From a consideration of the standard of purity of air required in a well-ventilated room, and assuming the velocity of wind to be not more than 2 feet per sec, calculate what should be the cubic space allowed for each person occupying the room, and the size of ventilator opening. 9

3. Distinguish between natural and artificial ventilation. 10

Describe, with a sketch, the method of ventilating a room by Tobin's Tube.

Write short notes on the subject of the provision of inlets and outlets for ventilating rooms with regard to

(1) their relative sizes, (2) their relative number, (3) their relative and best positions in the room.

Under what condition can an inlet be placed at floor level?

4. How is gas, used for lighting purposes, utilised as a means of ventilation? 9

Sketch and describe any device you know by which a gas burner is efficiently utilised in this way.

5. Calculate the size of a chimney shaft which will effectually pass out the air of a room, the temperature of the room being 60° F., and that of the external air 40° F. The shaft is 20 feet high. 11

What are the advantages and disadvantages of heating rooms by "stoves"? How are most of the disadvantages overcome in the manufacture of superior kinds of stoves?

6. State what precautions you would take 9

(1) to ensure thorough cleanliness, when samples of drinking water are required to be collected from a stream and sent for being analysed?

(2) to safeguard the health of the people, when a camp of labourers, employed on a large work, has to be set up? What additional precautions are necessary when cholera threatens to break out?

7. Describe the value of meat and milk as articles of food, and the diseases chiefly caused by impure milk. 13

How can the purity of milk be tested?

What are the objects of cooking meat?

Give a sketch of a suitable type of stables for cows which satisfies the essential requirements of such buildings.

8. How would you define Beer and Wine? 13

What are the general characters of good beer?

What do you mean by the expression "dryness of wines"? Describe any method by which the dryness of a wine may be increased.

Describe, in general terms, a method of determining the amount of alcohol present in a given sample of beer.

9. Write short notes on 11

(1) the effect of climatic changes on human bodies;

(2) the introduction of malaria in human system by mosquito bites;

(3) the value and uses of cotton and wool as mateirals for garments;

(4) the conditions which must be found te exist for establishing the microbial origin of diseases.

10. What gases are usually found to be present in sewage mains? Describe their characteristic properties and their origin. How is the quantity of foul air in sewers affected by barometric changes and by changes of temperature? 11

To what extent is sewer gas believed to lead to the contraction of zymotic diseases? What expedients are necessary to be adopted in the construction of drains and sewers to minimize the formation of sewer gas and its evil effects?

11. Distinguish between "surface soils," "sub-soils" and "made soils." 13

How do you account for the existence of ground water and ground air?

Discuss briefly the suitability or otherwise, from a health point of view, of the following sites for building houses on

(1) tops of hills, (2) foot of hills, (3) thickly wooded banks of rivers, (4) soils of the following description:—(*a*) gravel or sand, (*b*) sandstone. (*c*) stiff clay, (*d*) shallow beds of gravel overlying clay, and (*e*) alluvial lands.

What special treatment of the soil is necessary when houses are built on made soils, and on clay soils?

THURSDAY, 21ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANITARY ENGINEERING AND APPLIANCES.

1. A town has a population of 50,000 persons and a water supply of 30 gallons per head. The main outfall sewer is 18 inches in diameter. Presuming that the whole of the water supply reaches the sewers, what is the velocity of the sewage in the outfall sewer at the time of maximum flow, the gradient being such as to cause the sewer to run exactly full? 10

2. What do you understand by the expressions—invert, sight rail, boning rod, gradient, line of collimation, hydraulic mean depth? 10

3. An open storm water channel discharges into the sea through a pair of lock gates each 10 feet wide. Presuming that the channel is empty and the maximum tide level is 15 feet above the sill of the gates, what is the greatest pressure in pounds that the gates will have to sustain? 10

4. Describe the means of carrying out the following tests on house drains and house drainage appliances and comment on the results to be deduced from each test:— 15

(*a*) Hydraulic Test. (*b*) Smoke Test.

5. Sketch a cross section of a Shone's hydro-pneumatic ejector and explain its working. 15

6. Sketch a design for a septic tank installation for a population of 1,000 persons having a water-supply of 30 gallons per head. The sketch should show the inlet sewer, the detritus chamber, the inlet to and the outlet from the tank and all other appliances. All important dimensions should be given. 20

7. Under what circumstances, if any, is sewage disposal by irrigation preferable to that by biological methods? Is preliminary treatment of the sewage necessary or desirable before applying it to land, and, if so, to what extent? 20

XXIII.

FIRST EXAMINATION IN ENGINEERING.

EXAMINERS.

A. C. L. Wilkinson, M.A.	In Mathematics.
D. D. Kapadia, M.A., B.Sc.	
S. G. Burrow, B.Sc., A.R.C.Sc.	In Physics Paper II and Practical.
S. B. Butani, M.A., B.Sc.	
R. S. Cree Brown, B.Sc., A.M.Inst.C.E.	In Physics Paper I.
Joseph Hall, M.Inst.C.E., M.I.Mech.E.	
Chas. J. J. Fox, B.Sc., Ph.D.	In Chemistry.
Alex. R. Normand, M.A., B.Sc., F.C.S.	
S. K. Pimpalkhare, Esq.	In Drawing.
Joseph Hall, M.Inst.C.E., M.I.Mech.E.	
N. B. Macmillan, B.Sc.	In Practical Carpentry.
Tom. S. Dawson, Esq.	

Wednesday, 30th October.

[10-30 a.m. to 1-30 p.m.]

PHYSICS—Paper I.

1. Deduce a rule for obtaining the magnitude and line of action of the resultant of two parallel forces. 8

In what case is there no single resultant force?

2. State the conditions under which three forces, acting on a body, produce equilibrium. 14

A smooth hollow sphere of radius "a" has a small hole at the highest point, through which a uniform straight wire of length 2 "b" passes freely, the inner end resting against the inside surface of the sphere. Find the positions of equilibrium of the wire.

Of what kind is the equilibrium in each case?

3. A wheel and axle is arranged to lift water from a well. The wheel is 4 feet in diameter and is turned by hand; the axle is 5½ inches in diameter and carries a rope ½ inch in diameter. At the end of the rope is a four-gallon bucket, weighing 8 lbs. empty. What force must be applied to the rim of the wheel to raise the bucket full of water? 12

Sketch the arrangement of an ordinary block and tackle (second system of pulleys) to give the same mechanical advantage.

4. Define (*a*) limiting friction, 10

(*b*) centrifugal force,

(*c*) force of gravity.

How does the force of gravity on the moon compare with that on the earth, and why?

Deduce an expression for the rate of efflux of water from an orifice at depth H below the surface.

5. A train weighing 200 tons is accelerated by an engine exerting a constant force of 2 tons, until a speed of 40 miles an hour is reached. The friction is 5 lbs. per ton. What time and distance are required to attain full speed? 12

State clearly how each law of motion is illustrated in this example.

6. A gun weighing 10 tons fires a shot weighing 1 hundredweight. The gun is 12 feet long and the average pressure on the shot while in the barrel of the gun is 200 tons. The angle of elevation of the gun is 30°. Find the range, and the velocity of the gun's recoil, which is horizontal. 10

7. A steel ball A, of mass 1 lb., is rotated in a vertical plane about the point C, at the end of a string 2 feet in length. What must be the rate of revolution so that the string may be just relieved of tension at the top of the swing? 12

If the ball strikes directly a second stationary ball B, weighing 8 ozs., when at the bottom of the swing, what will be the linear velocities after impact? Take the coefficient of restitution as 0·8.

8. In an Atwood's machine there are two masses, each of 500 grammes. An additional mass of 20 grammes is added to one of these, and after descending from rest through 50 cm. this 20 grammes is removed. How long will it take the descending mass to traverse the next 100 cms.? 12

How is the machine used to determine the force of gravity? Is it accurate for this purpose? If you know a better method, name it.

9. Tabulate all the ways in which energy may be stored, stating the form in which it is stored, with an example of each method. 10

Explain clearly in your own words the nature of "potential energy."

WEDNESDAY, 30TH OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER II.

N.B.—Write the answers to the two sections in separate books.

SECTION I.

1. Prove the equation $p\,v = R\,T$ for a gas. What is "absolute" temperature? 13

Calculate the absolute temperature corresponding to 41° F.

2. Define "specific heat" of a substance. 13

Is the specific heat of a substance independent of its temperature?

A piece of platinum, of mean specific heat, ·035 and 3·5 kilogrammes in weight, is placed in a furnace until it has acquired its temperature, and then plunged in 6 kilogrammes of ice-cold water; if the common temperature is found to be 20° C., what must the temperature of the furnace have been?

3. Define the "dew-point". 12

Explain fully its use in the determination of the humidity of the air.

Briefly describe Regnault's hygrometer.

4. State the First Law of Thermodynamics. 12

What connection has it with the law of the Conservation of Energy?

From what height must a lump of ice at 0° C. fall in order to melt itself, supposing it possible to concentrate all the energy of the fall in the lump? $J = 4{\cdot}19 \times 10^7$ ergs.).

SECTION II.

5. If the handle of a vibrating tuning fork is held against a wooden board, the amount of sound is considerably increased. Explain carefully why this happens. Is the time during which the fork goes on vibrating affected, and, if so, why? 12

6. Describe the phenomenon of total internal reflection, and explain what is meant by the term "critical angle". 12

Prove the relation which connects the critical angle between two media with their relative refractive index.

7. Describe a method of determining experimentally the focal length of a concave lens. 12

A convex lens of focal length 12 cms. is placed 36 cms. from an illuminated object. A concave lens is placed 10 cms. beyond the convex lens, and an image is formed on a screen 24 cms. beyond the concave lens. Calculate the focal length of the concave lens.

8. Define carefully the terms "illuminating power" and "intensity of illumination". 12

Show that the intensity of illumination of an object is inversely as the square of its distance from the source of light.

Explain clearly how this principle is made use of in the comparison of illuminating powers by means of Rumford's Photometer.

THURSDAY, 31ST OCTOBER.

[10-30 A.M. TO 1-30 P.M.]

MATERIALS OF CONSTRUCTION.

SECTION I.

1. State and describe the different kinds of limestones used, for building purposes, in Bombay, the sources from which they are obtained and the uses to which they are put. 1

Describe the composition and appearance of the Deccan Trap, and the purposes for which trap stone is used. Describe the weathering of trap, and the uses to which decayed trap is put.

2. Explain fully on what factors the durability of a stone depends. How can samples be judged, in a rough and ready manner, as to their comparative durability? 1

Distinguish between igneous and sedimentary stones as regards their suitability for building purposes. How should the latter be laid (1) in walling, (2) in cornices, (3) in arches?

In what respects are artificial stones preferable to natural ones? In absence of either, what else can you substitute as building material?

3. Describe briefly the different processes to be passed through for preparing mortar, for building purposes, from a given variety of limestone and sand. Does it make any difference in the process if the mortar is to be prepared for plaster? If so, how?

A sample of limestone, on being tested, is found to consist almost wholly of calcium carbonate with a slight admixture of sand. Describe any suitable method by which you would treat the lime, obtained therefrom, so as to make the mortar suitable for use in sub-aqueous works.

4. What are the essential requisites of good lime mortar? Describe how mortar is tested with regard to each of them.

Taking a small quantity of mortar in your hand, how can you tell whether the specimen is good or bad?

How much slaked lime can you expect to obtain from burning 100 cubic ft. of good kunkar, and how much mortar, if the lime is mixed with sand in the ratio of 1 to 2?

5. In what respects is cement mortar superior to lime mortar? Why is it not, generally, used in preference to lime mortar?

How do the use of sand and sea water affect the quality and strength of cement mortar and lime mortar?

Describe the process of manufacturing Portland cement in Europe. Why is it difficult to manufacture it in India?

6. What are the two principal ingredients in brick-earth, and the effects which an excess of either has on the resulting bricks?

If a brick-earth contains kunkar nodules, how would this affect the quality of the bricks made from it? How should such soil be treated?

What causes bricks to assume the following colours:—white, bluish, light yellow, deep red? How are bricks artificially coloured?

In what way are bricks burnt in kilns superior to those obtained from clamp-burning?

SECTION II.

7. Distinguish between exogenous and endogenous timber trees. Draw a cross section of a timber tree and name all its parts.

What is the best time for cutting trees to obtain good timber for building purposes, and why? What are the characteristics of good timber?

8. Describe the process of smelting iron from its ores. Why is flux used in the furnace? Besides melted iron what other substance is obtained from the smelting furnace, and for what purposes is it used?

Compare cast iron, wrought iron and steel as regards their strength to resist various strains. Distinguish between tempering and annealing steel.

9. What is soldering? What conditions should a good solder fulfil? What are hard and fine solders?

10. Give approximate quantities of materials required for a good plaster, to stand heavy rain, on 1,000 square feet of wall surface.

What is distemper and what ingredients are chiefly used in its preparation?

THURSDAY, 31ST OCTOBER.
[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY.

Equations and diagrams of apparatus to be given where possible.

SECTION I.

1. Describe the preparation and properties of nitric oxide. 12

What experiments would you perform in the laboratory to show that nitric acid contains nitrogen? Describe the apparatus you would use.

2. Give an account of the ionic theory and describe how the electrolysis of a solution of potassium sulphate may be explained with its help. 12

3. What is the action of concentrated sulphuric acid upon (*a*) potassium bromide, (*b*) potassium chloride? 13

How would you prepare a solution of hydrogen bromide? What would be the action of this liquid on zinc?

4. Describe two methods of preparing sulphur dioxide. 13

Calculate the volume of each gas produced when 1 gram of carbon disulphide (CS_2) is burned in 2,000 cc. of oxygen at 0° C. and 760 mm.

SECTION II.

5. Describe clearly what are meant by the terms oxidation and reduction and give three instances, in each case, in which substances are reduced (*a*) in the state of gas, (*b*) in solution, (*c*) in the solid state. Give similar instances illustrating oxidation. 12

6. How may ozone be obtained? Compare its properties with those of oxygen. Explain how its composition is determined. Why is it said to be an endothermic substance? 12

7. What is the most important ore of lead? How is lead prepared from it? Describe how you would prepare a crystallised specimen of any one of the salts of lead. 12

8. 25 cc. of dilute sulphuric acid is exactly neutralized by 19·65 cc. of potash solution and the resulting potassium sulphate weighs 1·246 gms. Describe how this experiment might be carried out with a view to determining the strengths of the two solutions. Calculate the strengths of the two solutions and also how much sulphuric acid would be contained in 10 litres of the dilute acid. 14

$$C = 12, S = 32, O = 16, H = 1, K = 39.$$

FRIDAY, 1ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

TRIGONOMETRY AND CALCULUS.

SECTION I.

1. Prove the formulæ for $\sin (A - B)$, $\cos (A - B)$ in terms of the sines and cosines of A, B where the angles A, B are both acute. 9

Take a straight line AB of length a and draw two perpendiculars at its extremities. Find two points A', B' on these perpendiculars such that $BB' = 2AA'$ and the tangent of the difference of the angles BAB' and ABA' may be equal to a given quantity k. Show that k cannot be greater than $\frac{1}{4}\sqrt{2}$.

2. Express $\sin x$, $\cos x$, $\tan x$ in terms of $\tan\frac{x}{2}$. 9

If $11 \sin x + 3 \cos x = 7$, find $\tan\frac{x}{2}$, and prove that $\tan 2x$ is either $\frac{120}{119}$ or $\frac{24}{7}$.

3. Prove that in any triangle $a^2 = b^2 + c^2 - 2bc \cos A$. Deduce an expression for $\tan\frac{A}{2}$ in terms of the sides. 13

The angle of elevation of A, the top of an inaccessible tower AB, is observed from a point C to be 24°. A base line 400 feet long is drawn from C to a point D and the angles BCD, CDB are observed to be 95°, 54° respectively. Find the height of the tower.

$\log 2 = \cdot 3010$, $L \sin 54° = 9 \cdot 9080$, $L \tan 24° = 9 \cdot 6486$, $L \sin 31° = 9 \cdot 7118$, $\log 2 \cdot 797 = \cdot 4468$.

4. Find an expression for $\tan\frac{A-B}{2}$ in terms of a, b, C. 11

If $a = 19$, $b = 1$, $A - B = 60°$, find all the angles of the triangle.

$\log 3 = \cdot 47712$, $L \tan 32° 38' = 9 \cdot 8072$.

5. Draw the graph of $y = \sin^{-1} x$. 8

$$\text{Prove that } \sin^{-1}\left(\sqrt{2}\sin\theta\right) + \sin^{-1}\sqrt{\cos 2\theta} = \frac{\pi}{2}.$$

SECTION II.

6. Prove the rule for differentiating the product of two functions. 12

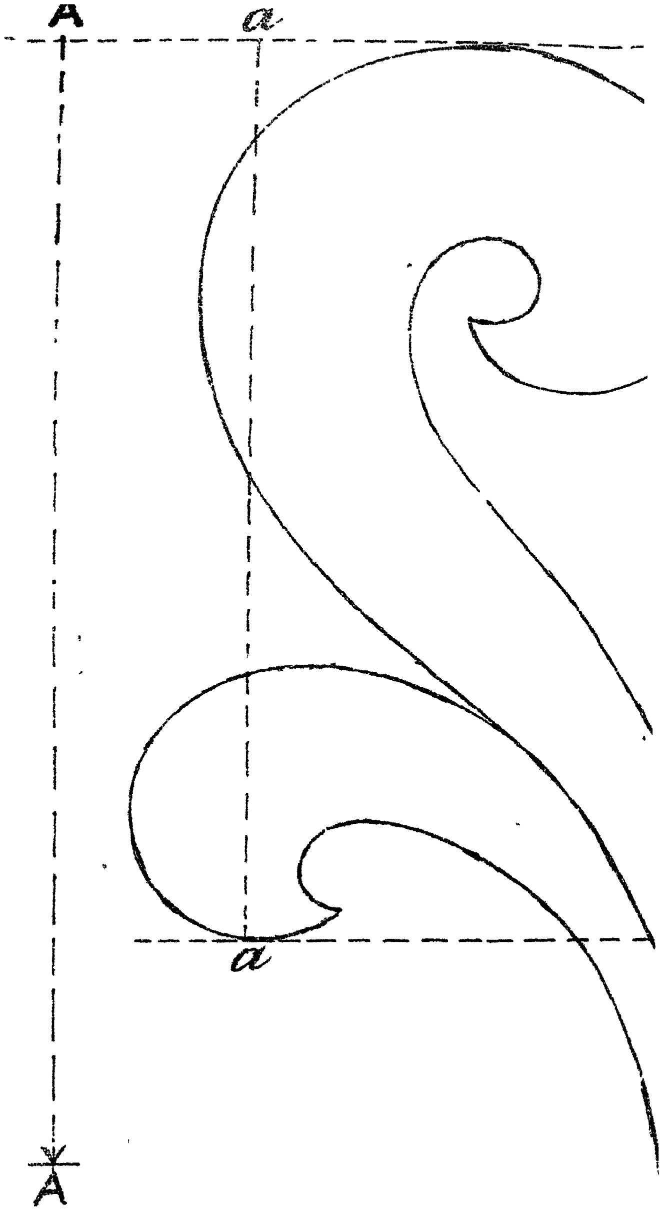
Differentiate $\frac{1 + 2x - x^2}{4 + 4x - x^2}$, $\frac{1}{\sqrt{x+1} - \sqrt{x}}$, $x\sqrt{x^2 - 1}$.

7. State and prove the necessary and sufficient conditions for a maximum or a minimum of a function of a single variable. 11

Trace the curve $y = 2x^3 - 3x^2 + 1$. For what values of x is there a maximum or a minimum ordinate, a point of inflexion? What is the gradient at the point of inflexion?

8. Integrate:— 11

$$\frac{6x + 5}{(x + 2)(x - 3)}, \quad \frac{x}{(x - 1)^3}, \quad x(a^2 + x^2)^3.$$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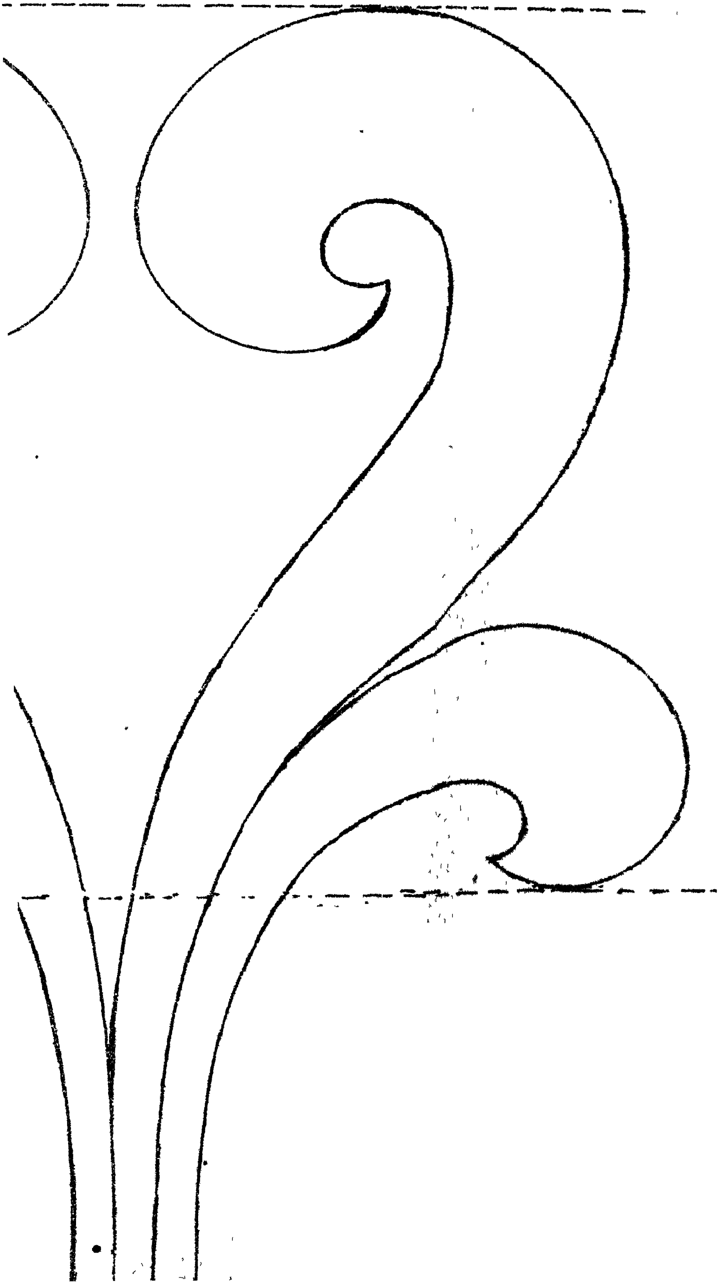


9. Show how to change the variable in $\int f(x)dx$ from x to u, where $x = \phi(u)$. 11

Integrate—

$$\frac{1}{(x^2 + 2x + 5)^{\frac{3}{2}}}, \quad \frac{x^2}{\sqrt{x+1}}.$$

10. Define an integral as a sum and calculate from your definition the 5

$$\int_0^a (a^2 + x^2)\, dx.$$

SATURDAY, 2ND NOVEMBER.

[10-30 P.M. TO 2-30 P.M.]

DRAWING.

1. Two converging lines meet at a point beyond the surface of a table. Find by construction the line bisecting the angle between them. 8

2. Inscribe a parabola in any parallelogram, one side being equal to 4 inches. 8

3. Draw a semi-ellipse using the method of radial lines. 8

Transverse diameter 4 inches, conjugate diameter 2½ inches.

4. Draw a cone 1¾ inches in diameter and 2 inches in height and project the figure formed by a plane cutting the cone at an angle of 45° with the base. 8

5. Draw in Isometrical projection a hexagonal prism of 4 feet height resting on the top of a square block of 5 feet sides. 8

The base of the hexagonal prism has every side of 2 feet. Scale one inch to one foot.

6. Draw an Isometrical scale. 5

7. Define the following terms :— 10

Cone of rays.
Station point.
Centre of vision.
Horizontal line.

8. Put into perspective a rectangular box 12 feet long, 10 feet wide and 4 feet high, the long side vanishes to the right at angle of 40° with the picture plane. 15

The nearest corner touches the picture plane and is 3 feet to the left of the spectator.

The thickness of the box is half a foot on all sides.

Distance of spectator from the picture plane 14 feet.

Height of eye above ground plane 6 feet.

Scale ½ of an inch to one foot.

9. Freehand Drawing to be copied on the larger scale in the proportion shewn by the dotted line. 15

XXIV.

SECOND EXAMINATION IN ENGINEERING (CIVIL

EXAMINERS.

A. C. L. Wilkinson, B.Sc., M.A. ... D. D. Kapadia, M.A. ...	In Mathematics.
S. G. Burrow, B.Sc., A.R.C.Sc. ... S. B. Butani, M.A., B.Sc. ...	In Physics.
R. S. Cree Brown, B.Sc., A.M.Inst.C.E. ... Joseph Hall, M.Inst.C.E., M.I.Mech.E. ...	In Mechanics.
H. J. Unvala, B.Sc., L.C.E. ... K. S. Framji, B.A., L.C.E. ...	In Engineering and E gineering Drawing.

Wednesday, 30th October.
[2-30 p.m. to 5-30 p.m.]

MECHANICS.

N.B.—Only eight questions to be attempted. Equal marks for all questions.

1. What is meant by virtual centre?

The length of the crank of a steam engine is 1 foot and of the connecting rod 5 feet. The crank rotates at a speed of 140 revolutions a minute. What is the velocity in feet per second of the piston when the crank is 30° from the inner dead centre?

What then is the turning moment, if the pressure on the piston is 5 tons?

2. A pull of 50 lbs. is applied to the hand chain of a tackle. This chain passes over a chain wheel 10″ in diameter attached to a double-threaded worm. The latter gears with a worm wheel having 32 teeth. If this wheel carries a chain wheel 8″ in diameter and the over all efficiency is 75 per cent., what weight can be lifted by the last-mentioned chain?

What pull on the hand chain would be just sufficient to keep the weight from running back?

3. A crane has a central vertical post *A*, 20 feet high, and a jib *B* at an inclination of 45°. The upper end of *B* is supported from *A* by a horizontal rope *C*, and a rope *D* passes from the foot of the jib over a pulley on its upper end in the usual way, and supports a load of 2 tons.

A is supported by a guy rope *E* fixed to the ground behind *A*, and inclined at 45°. Find graphically the stresses in *A*, *B*, *C*, and *E*.

4. A steel wire is 0·2 inches in diameter and 400 feet long. How much will it stretch under a pull of 440 lbs.? Young's modulus for steel is 30×10^6 lbs. per square inch.

Explain what would happen if a load 10 times as great were applied.

5. A pulley 4 feet in diameter is attached to a 4 inches shaft rotating at 180 revolutions a minute and transmitting 20 H. P. by means of a belt passing round the pulley If the total pull of the belt is 800 lbs., how is this divided between the two sides of the belt?

If the belt is 8 inches wide × ¼ inch thick and weighs ·07 lb. per cubic inch, what will be the tension in it due to centrifugal force?

6. In the last example the shaft is supported in bearings 2 feet and 4 feet from the pulley and on opposite sides of it. The belt pull is vertically upwards, the pulley weighs 400 lbs. and the shaft weighs 0·28 lbs. per cubic inch.

Find the bending moment at the pulley and draw the shear diagram for the shaft.

7. An engine runs at 210 revolutions a minute and has a flywheel of 3 feet mean radius. If the speed is not to vary by more than 1½ per cent. from the mean, and the effort of the engine fluctuates by 20,000 foot-pounds above and below the mean rate of output, what must be the cross section of the flywheel rim?

Cast Iron weighs 0·26 lbs. per cubic inch.

8. An engine starts a train, of total weight 400 tons, from rest, up a grade of 1 in 100. The friction is 5 lbs. per ton, and the acceleration is uniform. The speed attained in 2 minutes is 20 miles an hour.

What is the force exerted by the engine?

What power must the engine be capable of?

What distance is travelled in the first 2 minutes?

9. A hydraulic press is to exert a pressure of 40 tons. The ram is 18 inches in diameter and the plunger of the pump supplying pressure is 2 inches in diameter. If the total efficiency is 80 per cent. what pressure must be applied to the pump plunger?

How would an accumulator be used with this apparatus?

Of what size should the accumulator be to store 250 foot-tons of work, and what weight would it require?

10. Sketch neatly the headstock of a lathe for metal work, and show by dimensions and remarks how you would design it to give speeds of 6, 15, 30, 54, 135 and 270 revolutions a minute.

11. Describe and illustrate by neat sketches any apparatus, other than brakes for vehicles, which depends on friction for its action.

Would a total absence of sliding friction be beneficial, in your opinion, to the work of the engineer? Give reasons for your opinion.

WEDNESDAY, 30TH OCTOBER.

[2 30 P.M. TO 5-30 P.M.]

PHYSICS.

SECTION I.

1. Describe the method of determining the specific gravity of a solid by the specific gravity bottle. 13

A bottle filled with water is found to weigh 500 gms. If 180 gms. of a powder are introduced into the bottle, the bottle with its contents weighs 575 gms. Calculate the specific gravity of the powder

2. Draw a neat diagram of the common or suction pump and describe it fully. 12

Also show how the force required to raise the piston rod, when the barrel is already full of water, may be calculated.

3. Define the "strength" of a magnet, the "magnetic moment" of a magnet and a "uniform magnetic field." 13

A bar magnet is suspended in a uniform magnetic field by means of a thin silver wire. The wire is twisted through an angle of 100° in order to deflect the magnet through 30°; with what twist in the wire will the magnet be deflected through 45°?

4. Briefly explain the principle of an air-condenser. 12

What is meant by the "specific inductive capacity" of a dielectric?

Of the four Leyden jars *A*, *B*, *C* and *D*, the first three are made of glass while the last is made of guttapercha. *A*, *B* and *D* are of the same size while *C* is thrice as tall and twice as wide as the others. *A*, *C* and *D* are of the same thickness of material while *B* is made of glass twice as thick as either *A* or *C*. Compare their capacities, the specific inductive capacities of glass and guttapercha being 3·2 and 2·4 respectively.

SECTION II.

5. Explain carefully the terms "permeability" and "susceptibility". Show how the formula $B = H + 4\pi I$ is arrived at, and define the quantities represented by the symbols in this formula. 13

6. Describe experiments by which you could illustrate the phenomena of electro-magnetic induction. State the two fundamental laws of induction, and show how they apply to the experiments you have described. 12

Give a rule for determining the direction of the current induced in a conductor when it is moved in a magnetic field.

7. A rectangular coil of wire is rotated about an axis in its plane between the poles of a horse-shoe magnet, the axis of rotation being perpendicular to the line joining the poles of the magnet. Describe the changes in the *E. M. F.* and current produced in the coil during a complete revolution. 13

Explain, with sketches, how

(*a*) an alternating current

(*b*) a uni-directional current

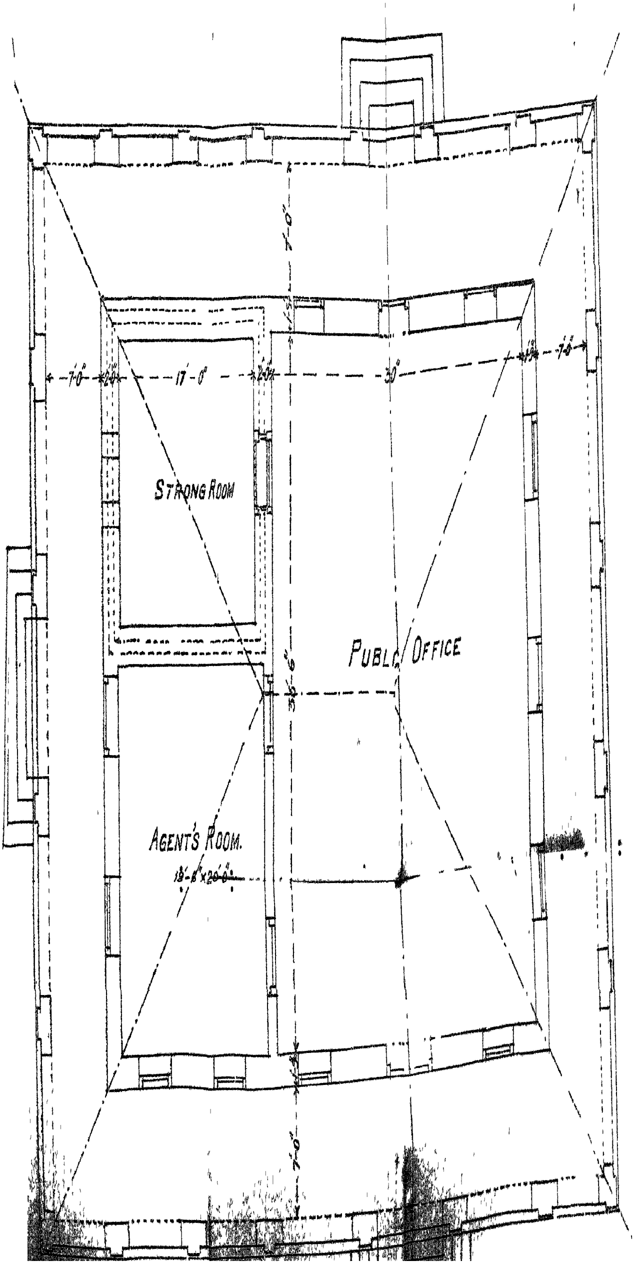
may be obtained from the current in the rotating coil.

8. An arc lamp and a glow lamp are connected in parallel across the mains from a dynamo which generates current at a constant voltage of 200. 12

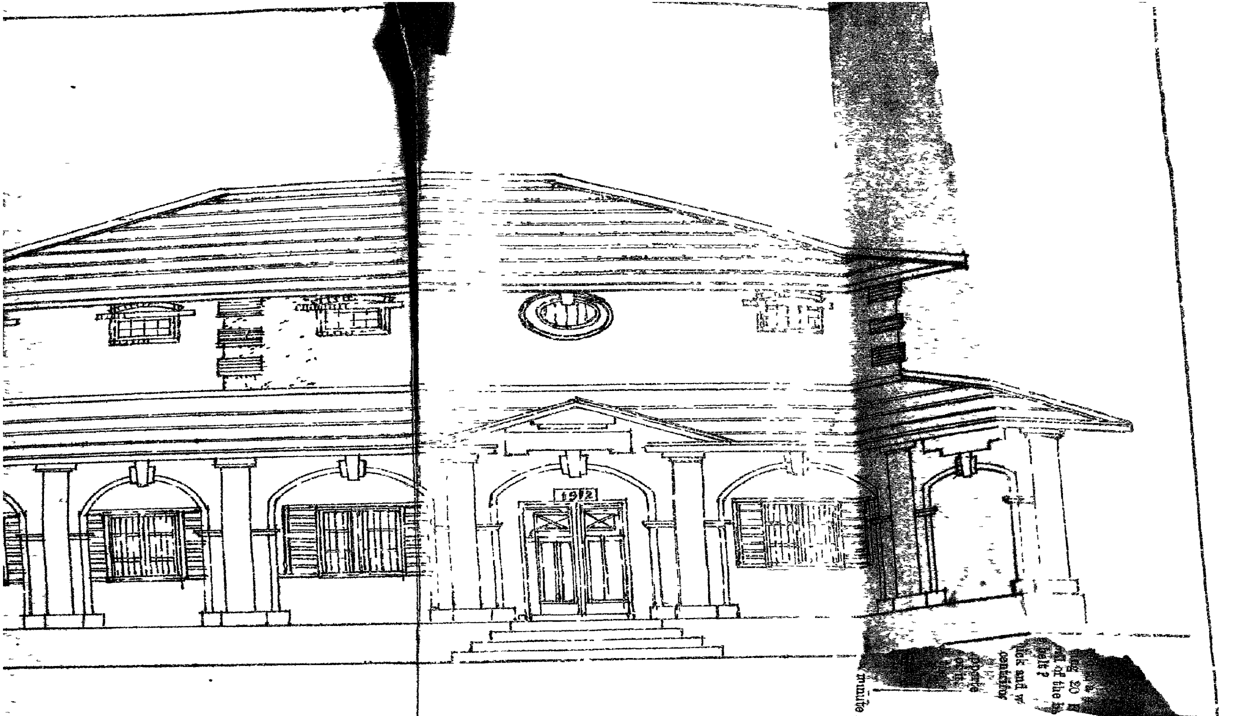
If 10 amperes are to be taken by the arc lamp, and the potential difference between the carbons is to be 50 volts, what resistance must be used with the arc?

If the resistance of the glow lamp, when hot, is 400 ohms what is the total output from the dynamo in watts?

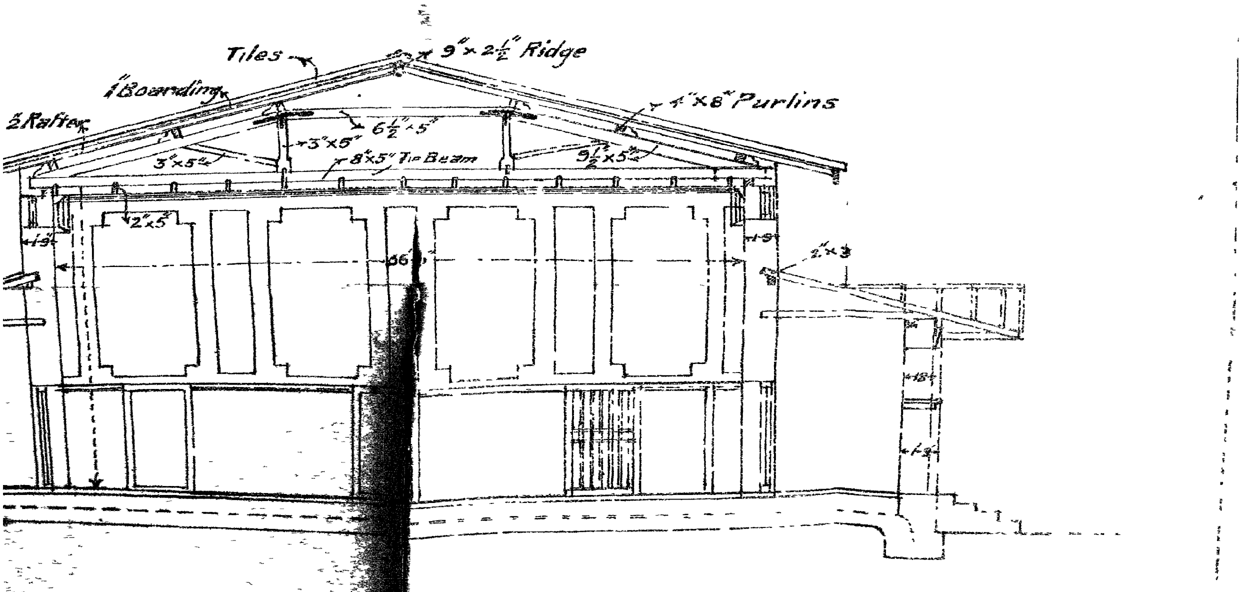
What percentage of the energy is usefully employed in the two lamps, and what percentage is wasted in the resistance?



7'-0"
7'-0"
2'-0"
17'-0"
2'-3½"
30'
1'3½"
7'-6"
STRONG ROOM
PUBLIC OFFICE
36'-6"
AGENT'S ROOM.
13'-8"x20'-0"
7'-0"



FRONT ELEVATION.



SECTION ON A.B.

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What percentage of the energy is usefully employed in the two lamps, and what percentage is wasted in the resistance?

THURSDAY, 31ST OCTOBER.

[10-30 A.M. TO 1-30 P.M.]

ROADS AND RAILWAYS.

1. Explain the chief points to be considered in determining the direction of a proposed road, and state the circumstances which would justify a deviation from the direct line. 10

2. To what causes are slips in earthwork attributable? What precautions should be taken to prevent them? 8

3. Why is a road surface metalled? What materials are generally used for the purpose? Give a brief specification for metalling with broken stone. 12

4. Draw four concentric circles, one inch apart, the diameter of the smallest being one inch. Assuming these circles to be contours at 50 feet vertical intervals, of a conical hill, draw the track of a road ascending from the lowest contour to the summit at a slope of 1 in 30. Find the length of the road. 12

5. What conditions should be complied with in order to ensure that the permanent way of a railroad may be strong enough to bear, without damage, the heaviest loads which are likely to come upon it? 10

6. Compare the respective advantages and disadvantages of wooden and iron pot sleepers. In what ways are wooden sleepers used? 14

Give sketches of the cross-sections of a railway line with double-headed and flat-bottomed rails.

7. Draw a sketch of a crossing and mark on it the following:—switches, heel, stock rail, wing rails, guard rails, and switch locking bar. 12

8. What is meant by the adhesion of a railway track? What is its amount in terms of the load on the driving wheels? 12

State, with reasons, the principles governing the coupling of wheels of an engine, in different methods, under varying speeds, loads, and gradients.

9. Describe, with sketches, the action and working of Stephenson's link motion for reversing an engine. 10

THURSDAY, 31ST OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

MENSURATION AND CALCULUS.

1. A piece of tin in the form of a circle of radius 10 inches has one quadrant cut out of it and is then bent into the shape of a conical vessel, the two radii when the quadrant was removed being soldered together. Find the breadth of the base and how much water the vessel can contain. 6

2. Find an expression for the volume of a tetrahedron in terms of the area of its base and its height.

ABC is an equilateral triangle: equal isosceles triangles BCX, CAY, ABZ are described on its sides outwards, and these triangles are folded about their bases BC, CA, AB so as to form a tetrahedron. If the volume of the tetrahedron thus formed is twice the volume of the regular tetrahedron described on ABC as base, prove that the side of the isosceles triangle is twice the altitude of the equilateral triangle.

3. Prove that the volume of a spherical cap of height h is $\pi h^2 (r - \frac{1}{3} h)$, r being the radius of the sphere. 13

A right circular conical cup of semivertical angle 30° and height 10 inches is completely filled with water and then a sphere of radius 4 inches is slowly lowered into the cup. Find how much water will overflow and how much of the surface of the sphere will be wetted.

4. Find an expression for the volume of a frustum of a cone in terms of its height and the radii of its parallel plane surfaces. 13

A right circular cone, the radius of whose base is a, and whose height is $2a$, and a sphere of radius $\frac{5}{8}a$ are both standing on a horizontal plane. Find at what distance another horizontal plane must be drawn to cut them, so that the volumes intercepted between the cutting plane and the plane on which the cone and sphere stand may be equal.

5. Differentiate:— 15

$$\tan x, \ \tan^{-1} x, \ \tan^{-1} \left\{ \sqrt{\frac{a-b}{a+b}} \tan \frac{x}{2} \right\}.$$

Trace carefully the curve, $a^2 y = x^2 (a - x)$. Show that the straight line joining the origin to the point of inflexion cuts the curve again in a point whose ordinate is a maximum.

Find the area between the curve and the axis of x between $x = 0$ and $x = a$.

6. Prove that the curvature of a curve at any point is given by:— 6

$$\frac{d^2 y}{dx^2} \cos^3 \phi, \text{ where } \tan \phi = \frac{dy}{dx}.$$

7. Prove the rule for integrating by parts. 11

Integrate—

$$\frac{2x+1}{\sqrt{9 + 4x - x^2}}, \ x \sin^{-1} x.$$

8. Prove and illustrate graphically that— 11

$$\int_0^a \phi(x)\, dx = \int_0^a \phi(a - x)\, dx.$$

Evaluate—

$$\int_0^{\frac{\pi}{2}} \sin^5 x \, dx, \ \int_0^{\frac{\pi}{4}} \tan^6 x \, dx.$$

9. Find (1) the centre of gravity of a semicircle; 13

(2) the moment of inertia of a triangle about its base;

(3) the centre of pressure of a rectangle immersed vertically in a fluid with its base in the surface.

FRIDAY, 1ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

MASONRY AND FOUNDATIONS.

N.B.—Not more than eight of the following ten questions, including question No. 1, should be attempted.

1. A verandah 7 feet wide has to be provided in front of a building 50 feet long. The front wall is of Coursed Rubble Masonry 1st sort, and is $1\frac{1}{2}$ feet wide and 15 feet high, above plinth level on the external face. Describe the most suitable and economical method you would adopt for executing the work, giving a dimensioned cross section of the verandah and front wall. The posts to be not more than 8 feet high and roof covering to be of country tiles.

State what changes, if any, it would make in the method adopted under the following altered conditions:—

(1) The front verandah to be made 10 feet wide instead of 7 feet.

(2) The front wall was 12 feet high and not 15 feet.

(3) The front wall was of brick and mud masonry instead of C. R. masonry.

2. What is the usual proportion of ingredients for concrete in foundations of ordinary buildings, and how can you, experimentally, determine the correct proportion required in any case, where the aggregate consists of materials of different sizes?

On what factors does the strength of masonry depend? If trap rock can stand an ultimate crushing load up to 600 tons per sq. foot, to what safe limit could you load a detached stone of that rock, and what will be the safe permissible load on masonry made of such stones set in lime mortar? Give reasons.

What difference in preparation and quality would you allow for in mortar required in the following cases and why:—

(*a*) Where the stones are large and well dressed on beds; (*b*) where the stones are small and irregular in shape; (*c*) where mortar is required for plastering work?

3. State the essential differences between the three sorts of Coursed Rubble Masonry.

Calculate the cost of a wall 50′ × $1\frac{1}{2}$′ × 12′ of C. R. Masonry 2nd sort, when the cost of materials at site are as follows:—

Headers and khandkies (undressed) Rs. 10 and Rs. 6 per 100 respectively; rubble, lime and sand Rs. 4, 30 and 4 per 100 cubic foot, respectively.

4. (*a*) Distinguish between English and Flemish Bond for brick masonry and state their relative advantages.

Why is English bond more suitable for adoption in the case of footings of brick masonry walls? Illustrate this by giving sections of a two-brick masonry wall with three footings having offsets of $2\frac{1}{4}$ inches.

(*b*) Why are battens necessary for roofs of common rafter construction and purlin rafter construction? In what respects is a Mangalore-tiled roof superior to one of country half-round tiles?

5. Sketch a suitable scaffolding required for constructing a brick masonry wall of a three-storeyed building, the front wall of which is 50 feet long and the height of each storey 12 feet. Name all the different parts.

How does a brick-layer's scaffolding differ from that of a stone mason?

6. An iron bar 4" × 6" × 6" is made to drop freely through a height of 10 feet before it reaches a soil to be tested, in which it penetrates 4". What is the resistance of the soil? 13

Would the soil [illegible] bear a brick masonry wall 2 ft. wide and 12 ft. high loaded at the top with a weight equivalent to 3½ tons per running foot of wall, assuming a proper factor of safety? The specific gravity of brickwork and iron may be taken to be 2 and 7·7 respectively.

Is the wall itself safe under the load placed on it?

7. What considerations enable you to decide the necessary width and depth that should be given to the foundations of a building? 12

State the relative advantages of concrete and masonry foundations.

Discuss the relative merits of wood, cast iron and wrought iron as regards their suitability or otherwise for the construction of piles for foundations in different situations.

8. Define "bearing power of soils" and "footing courses" as applied to foundations of structures. In what way are the two related? 12

How is the risk of unequal settlement avoided in building on a site where soils vary?

A dry clay soil, in its natural state, is incapable of bearing a heavier load than 1 ton per square foot. Describe the methods in which the soil may be dealt with to enable it to receive the foundations of a building which produce a load of 1½ tons per square foot.

9. State, giving reasons, the nature of foundations you would adopt in each of the following cases, and give brief descriptions of each:— 14

(1) For a building on a site where the soil consists of 3 feet of black soil, 1½ feet of average murum, with soft soil and sand, below, extending to great depths.

(2) Conditions same as above, but intervening layer of average murum not existing and the soft soil and sand being moderately wet.

(3) For masonry piers of a bridge laid in the bed of a river consisting of wet sand ten feet deep resting on hard substratum.

(4) In the construction of a timber-topped bridge across a creek, the bed of which consists of silt and clay for great depths.

10. Describe with a sketch the method of sinking Iron Tubular foundations by the pneumatic process. Under what conditions is this system adopted? 11

FRIDAY, 1ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SURVEYING.

1. Describe the method of constructing a scale of chords, and show that the divisions on it from 0 to 90 degrees are not equally divided. 14

A map 50 inches long, and 20 inches broad, represents an area of 25 acres. Draw the scale of the map to show poles, yards, and, diagonally, feet, and mark on it 10 poles, 3 yards and 2 feet. (4,840 sq yds. = 1 acre.)

2. What are the essential points of difference between a survey compass, prismatic compass, and a compass placed in a level? Why are East and West points interchanged in certain compasses? 12

3. Explain the force of the expression "If a chain is stretched too tight the measured line will be shorter than it really is." 1

A distance measured by a chain, two inches too long, was found to be 1,200 feet; find the correct distance.

If after surveying with the above chain the area of a plot of ground was found to be 36,000 acres, what is the correct area?

4. Define line of collineation and virtual line of sight. How will you adjust the line of collineation in a Y level, and state why only half the error is to be corrected each time? What method is adopted in actual levelling operations to eliminate errors of this kind? 1

5. Explain, briefly, correction for earth's curvature, parallax, bench marks, flying levels, datum line, exaggeration of scales, and contouring. 1

6. The forward bearings of two lines AB and BC are 300 and 30 degrees respectively; find the angle ABC. 1

A curve is to be laid out between these two lines by off-sets from the tangents with a 1,000-foot radius. Find the length of tangents and calculate off-sets at 100 feet distance apart.

7. What is meant by 'Repetition" in taking angles by a theodolite? What kind of error is this method likely to diminish? 10

8. What is a Satellite station? How are angles taken from it reduced to the centre, and what additional observations are necessary? 1

SATURDAY, 2ND NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

SOLID GEOMETRY AND ANALYTICAL GEOMETRY.

1. If a straight line is perpendicular to each of two intersecting straight lines, at their point of section, then it is also perpendicular to every line which is in the plane determined by the intersecting straight lines, and which it meets.

Show that the length of the straight line joining the middle points of a pair of opposite edges of a regular tetrahedron is $\frac{1}{\sqrt{2}}$ of the length of an edge.

2. Any two of the angles that form a trihedral angle are together greater than the third. 1

The three plane angles of a trihedral angle are 45°, 45°, 60°; prove that the dihedral angle opposite the plane angle of 60° is a right angle.

3. How do you define the angle between two straight lines which do not intersect? Upon what proposition does the definition rest? 1

Show that it is possible to choose six middle points of the edges of a cube that will be the vertices of a regular plane hexagon, and that there are only four such hexagons.

4. If two straight line are cut by three parallel planes, they are cut in the same proportion. 11

Points P, Q are taken on two straight line AB, CD not in the same plane, such that $AP : CQ$ is constant; prove that the locus of the middle point of PQ is a straight line.

5. ABC, $A'B'C'$ is a prism, the edges AA', BB', CC' being parallel, but the plane of the faces ABC, $A'B'C'$ are not parallel. If G, G' are the centroids of ABC, $A'B'C'$ respectively, prove that— 1

$$3\,GG' = AA' + BB' + CC'.$$

6. Find the equation of a straight line in the form $x \cos \alpha + y \sin \alpha = p$. Show how you will proceed to find the bisectors of the angle between any two given straight lines.

Find the centre of the circle inscribed in the triangle formed by the three straight lines whose equations are $7x - y + 1 = 0$, $x - y + 5 = 0$ and $x + y - 5 = 0$.

7. Find the equation to the normal at the point $(am^2, 2am)$ of the parabola $y^2 = 4ax$.

The normal at any point P of a parabola $y^2 = 4ax$ cuts the axis in G and a point Q is taken on the normal so that G is the middle point of PQ. Prove that the locus of Q is a parabola $y^2 = 4ax - 16a^2$.

8. Prove that the distance between the centres of the circles $x^2 + y^2 - 6x - 4y + 8 = 0$ and $x^2 + y^2 - 3x + 2y + 2 = 0$ is equal to the sum of their radii.

Find the equations of circles which pass through the point (2, 0) and the origin and which touch the straight line $x + 2y + 8 = 9$.

9. Obtain the equation of the tangent at any point of the ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

Prove that $y = mx \pm \sqrt{a^2m^2 + b^2}$ is a tangent for all values of m.

Find the locus of the feet of the perpendiculars from a focus on all the tangents to the ellipse.

10. Show that the straight line $2y - x + 5 = 0$ is a common tangent to the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$, and the circle $x^2 + y^2 - 2x - 6y - 10 = 0$.

Show that the distance between the points of contact is $\sqrt{\frac{9}{5}}$.

SATURDAY, 2ND NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ENGINEERING DRAWING.

The accompanying two drawings give

(1) A longitudinal section of the country through which part of a road is proposed to be carried, and

(2) Cross sections of the ground line at chainages 1,990 and 4,100 (latter chainage not shewn on the longitudinal section).

At chainage 2,850 the road will cross a railway line *on the level*, the track being for a double line on the 5′-6″ gauge, and *R. L.* of top of rails being 52·04. Road to be level for 100 feet length.

The road to be a first class one, 21 feet wide at top, and to be completely drained and bridged.

Information has been given on the longitudinal section as to the nature of the masonry works required for each cross drainage, and the number and sizes of openings; also as to the nature of soil on surface of ground through which the line passes.

Two columns are left blank in the first drawing, namely (1) for entering the R. L.'s of formation at *every change* of gradient, and (2) for entering R. L.'s of formation at every masonry work. These columns are to be completed by you, as required in Question No. 1 below.

An additional sheet of drawing paper is supplied to you for executing certain extra drawings as required in Question No. 2 below.

1. You are required to complete the drawings given to you in the following respects:—

(1) To draw, on the Longitudinal Section, suitable gradients or formation lines, adopting a proper ruling gradient consistent with the requirements of a first class road which provides for fast traffic. and taking care to raise the road sufficiently at places where the nature of soil requires such raising.

Gradients, adopted, to be written, on the drawing, in the usual way, from chainage 0 to 3,600.

(2) To complete the two horizontal columns left blank in the section, by making the necessary entries in them as regards the formation levels required.

(3) To shew, in dotted lines, the beds of the diversion channels in the cases where no masonry cross drainage works are to be provided.

(4) To draw on the second sheet complete cross sections of the finished road, shewing depth of metalling, width of berms, positions of road boundary stones, &c., at the two places (chainages 1,900 and 4,100), for which cross sections of the ground are given on the drawing. In the plotted cross sections the reduced levels at the centre of the line of the road (at chainage 0) are given, as also those at 60 feet distance on either side of zero. Should the lengths of cross sections, given, prove insufficient, you may extend them, on both sides, at slopes of 1 in 40.

2. You are also required to draw on the other clean sheet of drawing paper supplied to you, the following:— 5

(1) A plan, on a scale of 6 feet to an inch, of the Railway level crossing, shewing

(a) the wooden gates of the crossing, as also the turn-stile gates.

(b) A suitable gatesman's lodge of adequate size and proper design, in the required position at the level crossing. A few data for the same are supplied below.

(c) The permanent way just in front of the gatesman's lodge and extending through a part of the level crossing; also the railway boundary fence near the gatesman's lodge (it being assumed that land is not expensive).

(2) A cross section of the gatesman's lodge taken through the centre of the building, drawn on a scale of 6 feet to an inch.

Note.—The plan required in Question 2 (*a*), above, is to be taken and drawn at a height of 4 feet above plinth level of the gatesman's lodge.

The lodge to consist of a front verandah, 6 feet wide, with two rooms of suitable sizes — one a sleeping room, and the other, smaller one, a spare room for stores, &c.; also a small room, at the rear, about 8' square, for cooking. The total plinth area of the building not to exceed 700 square feet, the plinth to be of C. R stone and lime masonry, superstructure of brick and lime; roof covering of Mangalore tiles. The roof over the rooms to be hipped. The lines of roofing to be shewn dotted on the plan of the lodge. Also positions and sizes of doors and windows to be shewn and their kind stated. Any other data, required, may be assumed as may seem appropriate, or deduced from information available.

N.B.—Much importance is attached to drawings being thoroughly complete as regards dimensions; all parts of the drawings should therefore be fully dimensioned and R. L.'s also written, where necessary, to connect corresponding levels in the different drawings.

XXV.

EXAMINATION FOR THE DEGREE OF B.E. (CIVIL)

EXAMINERS.

B. S. CREE BROWN, B.Sc., A.M.INST.C.E. ...	In Mechanics.
JOSEPH HALL, M.INST.C.E., M.I.MECH.E. ...	
M. K. KANGA, M.A., B.Sc., L.M. & S.	In Geology.
H. M. PAGE, F.I.C., F.G.S.	
N. B. MACMILLAN, B.Sc.	In Prime Movers.
TOM. S. DAWSON, ESQ.	
K. S. FRAMJI, B.A., L.C.E.	In Hydraulics and Irrigatio Drawings and Project an Water-Supply and San tary Engineering.
JOSEPH HALL, M.INST.C.E., M.I.MECH E. ...	

MONDAY, 19TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

MECHANICS.

N.B.—Only seven questions to be attempted. Equal marks for all questions.

1. A cube of cement is subjected to a shear stress of 300 lbs. per square inch, parallel to one of its pairs of sides. At right angles to this pair of sides a compressive force of 800 lbs. per square inch is applied.

Find the resulting shear stress and the principal stresses, and state the direction in which these act.

2. A bolt of steel having an elastic limit of 12 tons per square inch is 40 inches long and 1 inch in diameter. A short length at one end is threaded and carries a nut, the diameter of the bottom of the thread being 0·8 inch.

What load dropped through 3 inches will it carry without overstrain?

If the whole bolt is turned down to 0·8 inch in diameter to what extent will the safe load be altered?

3. A horizontal beam *ABCD* is built in at *A* and simply supported at *C*, which is level with *A*. It carries a load of 1 ton per foot run from *B* to *D*, and *AB*, *BD*, *DC* are respectively 4, 10 and 6 feet in length.

Draw the Diagrams of Bending moment and Shear force neatly to scale, and mark in all the important quantities.

4. An *N* truss of 180 feet effective span and 18 feet deep carries a dead load of 1 ton per foot run and a live load of 2 tons per foot run. The load is applied to the lower panel points, and the ends of the lower chord rest on the abutments; the diagonals are in tension.

Find by any method all the stresses at the lower panel point 54 feet from one end, when the shear in the fourth panel from that end is a maximum.

5. Design a closely coiled helical spring of round steel 0·5 inch in diameter, to carry a load of 0·25 ton with a deflection of 3 inches. The working stress to be 10 tons per square inch; E to be taken as 12,500 tons

6. A rivetted mild steel water pipe is 4 feet in diameter and the internal pressure is to be 240 lbs. per square inch. Design a double rivetted longitudinal lap joint for this pipe.

7. The teak beams of a road bridge are 10 inches deep × 8 inches wide, are spaced 3 ft. 6 in. apart from centre to centre. The span is 18 feet and the total load is 150 lbs. per square foot of road surface.

Find the deflection at the centre when the bridge is fully loaded, and the maximum stress in the beams.

Take E for timber as 1,500,000 lbs. per square inch.

8. A water tank is 10 feet deep and 20 feet square, and weighs 8 tons empty. It is supported on four independent hollow wrought iron columns which carry equal amounts of the weight, and are securely fixed into the tank and foundations.

The columns are 16 feet long and 6 inches in external diameter. Find the thickness required.

In Rankine's formula "a" or $\frac{\text{“}c\text{”}}{4}$ is $\frac{1}{9000}$ and $\frac{f}{c}$ = 16 tons per square inch. The factor of safety to be used is 5.

9. Design a masonry dam 40 feet high and 4 feet wide at the top. The batter at the back of the wall is to be uniform and the front face vertical; the water level is to be 4 feet below the top of the wall. The masonry weighs 130 lbs. per cubic foot.

Why is it usual to keep the resultant pressure within the middle third in masonry work?

Is this always necessary? If not, when do you consider it unnecessary?

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

GEOLOGY.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. What are mineral veins? What minerals commonly enter into their composition? What theories are put forward to account for their origin? What is a lode? In what rocks, and in what manner, do the following substances occur:—

Gold, manganese, tin, coal, iron.

2. Explain the meaning of 'Foliation' and 'Planes of schistocity'. How may the foliated rocks be classified according to texture? Explain this classification and give examples.

3. What indications would you look for to ascertain whether an igneous rock mass was intrusive or eruptive? What do these terms mean?

Classify the massive igneous rocks, showing the proportions of the essential chemical element.

4. Draw a map of India showing the principal river and hill-ranges, and mark upon it the areas occupied by the more important geological forma-

SECTION II.

5. What is meant by un-conformity? What does it indicate? Distinguish between overlap and overstep. Draw two figures to illustrate what are known as inliers and outliers. 12

6. Write short explanations of the following terms:— 12

Outcrop, fault, strike, hade, dip, stripe.

7. Give the composition and characters of the following substances:— 12

Trap, kankar, laterite, amygdaloid, shale, gneiss, moorum.

8. What is a glacier? What is the cause of its motion and its average velocity? In what important particular does the matter deposited by a glacier differ from that of a river? 14

TUESDAY, 19TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HYDRAULICS AND IRRIGATION.

N.B.—The answers to sections I and II should be written in separate books.

SECTION I.

1. A 12″ dia. pipe 5 miles in length 300 ft. head is full of water. 10

What will be the maximum pressure on the pipe when—

(*a*) The sluices are closed and there is no movement?

(*b*) Water is flowing through the pipe with a free outlet?

(*c*) When the sluice valve at the bottom is suddenly closed?

2. A section of a canal is built of steel 100 ft. in length, 20 ft. in breadth, 10 ft. in depth fitted with double gates at each end. The section is pivoted as a swing bridge. When the waterway is to be opened, the gates in the canal are closed and if at any time a boat is passing through it may be enclosed between the gates. Discuss what will be the effect of a 30 ton canal boat being in the bridge during the time it is being opened. 10

3. Lock 300 ft. long, 60 ft. wide, lift 25 ft. There are two inlets and two outlets at the bottom each 3 feet in diameter. 10

How long will it require to empty, and

How long to refil?

Note.—Lift is the difference between the water level in the upper pool and the water level in the lower pool.

4. Describe the various methods of measuring the flow in a stream of an average width of 6 ft. 10

(*a*) when the banks are parallel;

(*b*) when the width and depth are very variable.

5. Deduce a formula which enables you to ascertain the rise of water levels in a river after the construction of a bridge. 1

6. A channel 5 feet in width is conveying water containing debris, another channel 2 feet in width joins it at an angle. Discuss the reasons for a deposit and shew the conditions under which it will occur and how it may be avoided. 1

The detritus may be assumed to be coarse and fine sand with some mud.

N.B.—Attempt any *four* of the following *seven* questions.

SECTION II.

1. Describe the formation of a Delta and the changes which a Delta river undergoes in its slope and section.

Describe the system of irrigation practised in a Deltaic tract and explain the reason of the great adaptability of a delta river to irrigation and navigation purposes.

Explain, with reasons, what difference it makes in the nature of the various works required at the head and along the course of a canal when it takes off (1) from a delta river, (2) from a river subject to high inundations, like the Indus.

2. What is the object of a storage reservoir? How does its provision affect the design of a canal taking off from it? What considerations guide you in selecting the site of a tank, and the line of dam, in the case of a tank with earthen embankment?

Is black soil suitable for use in earthen embankments and for puddle and as foundations of earthen dams? Give reasons.

Sketch and describe the form of outlet from a tank known as Headwall in the centre line of Dam, and state the advantages and disadvantages of this form.

3. What functions do waste weirs serve?

In applying the usual formulæ for ascertaining the discharging capacity of waste weirs, what assumptions are made regarding

(1) the state of supply in tank,

(2) the disposal of flood during its rise from F. S. L. to H. F. L.?

The heaviest recorded fall of rain in the catchment of a tank, measuring 150 square miles, is 8 inches in 12 hours, and flood observations in the river show that the supply entering the river is 75 per cent. of the rainfall. A drowned waste weir, 1,400 feet long, is provided on the tank. Two hours after a flood begins to enter the tank the depth of water in the tail channel is found to be 3·2 feet, giving a discharge of 40,630 cusecs. Find the maximum height of flood above F. S. L and the total time it takes to rise to H. F. L., in the tank, assuming the contents of the tank to increase by 6·9 million cubic feet for every increase of 0·1 foot between F. S. L. and H. F. L. The following data are supplied :—

Depth of water in channel.	Corresponding height of water in tank above crest of waste weir.	Discharge in tail channel.
3·2 feet.	4·8 feet.	40630 cusecs.
3·3 ,,	5·0 ,,	42730 ,,
3·4 ,,	5·15 ,,	45120 ,,
3·5 ,, (maximum corresponding to H. F. L. in tank).	(To be ascertained.)	48600 ,,

4. The bed of a river consists of 30 feet of sand overlying clay; the sides and banks are of clay soil. Give a cross section and description of an open masonry weir of any suitable design you would construct in such a river for the head work of a canal, it being assumed that stones cannot be obtained except at prohibitive cost. The flood depth in river to be assumed to be 8 feet only. No calculations are required, but approximate dimensions should be marked on the drawing. 14

5. How is the preliminary survey of a proposed canal line from a tank made? What use is made of this line in the final alignment? Are any deviations made from the latter at the time of construction and why? 14

What do you understand by the expression "duty of water for rabi crop is 120 acres"? In what other ways is duty expressed? What circumstances tend to increase the duty and what to lessen it?

If D acres = duty of water, and B = the base of duty, shew that the depth of watering required for the crop, in feet, $= \frac{2B}{D}$.

Describe, in a general way, how the section of a canal, supplied by a tank irrigating different classes of crops, is designed.

Is the duty of water more on a canal or on a distributary? Give reasons.

6. Distinguish between syphons and aqueducts, superpassages and level crossings, notched falls and rapids, escapes and outlets. 14

What is the substitute for a lock-chamber in the Head Regulator of an Inundation Canal which is navigable, and how is it worked?

Give sketches (plan and section) of a combined syphon and overbridge on a branch canal at its head. Mark the F. S. L. in canals.

What is the disadvantage of the introduction of syphons on a canal? In what way is the barrel strengthened against water pressure when the syphon runs full?

7. What is the difference, in their function and working, between automatic gates on waste weirs of tanks and falling gates on crests of weirs across rivers? 14

Describe, with sketches, the construction and working of Fouracre's Double Tumbler Shutters or any other similar type of gates you know.

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PRIME MOVERS.

N.B.—Candidates may attempt *seven* questions only.

The marks allotted are shown to the right of question.

1. (*a*) Describe, with the aid of neat sketches, an experiment to determine the calorific value of a sample of coal. 13

(*b*) In a certain calorimeter test of producer gas, 1·23 cub. ft. of the gas was burned while 8·32 lbs. of water passed through the calorimeter, the temperature being raised from 80° to 100° F. Determine the calorific value of the gas in British Thermal Units per cub. ft.

2. (*a*) State the principal losses which occur in a boiler furnace, and describe the chief remedies adopted for reducing them. 1

(*b*) In a certain boiler installation, 22lbs. of air were used for each pound of coal burned, the air temperature being 60° F., and the chimney gases 500° F. What is the chimney waste expressed as a percentage of the heat generated in the furnace, if the calorific value of the coal is 12,500 B. T. Us. per lb.?

3. (*a*) Compare a Lancashire boiler with a Babcock and Wilcox boiler, stating clearly their relative advantages and disadvantages. 1

(*b*) A certain boiler evaporates 9 lbs. of water per lb. of coal, from feed water at 100°F. into steam at 120 lbs. per square inch (absolute). Another boiler can evaporate 8·6 lbs. of water per lb. of the same coal into steam at 175 lbs. per square inch (absolute), from feed water at 80° F. Compare their evaporative performances.

Temperature of steam at 120 lbs. absolute = 341° F.
" " 175 " " = 370·6° F.

4. A steam engine has a stroke of 4 feet, cut off ¼ stroke, clearance volume one-fourth of piston displacement, and uses steam at an initial pressure of 120 lbs. per square inch (absolute). 1

Find the terminal pressure (*a*) without clearance;
(*b*) with clearance.

Show from your answer that the effect of clearance is to raise the expansion curve.

How would you measure the clearance volume of a steam cylinder?

5. (1) Draw what you would expect the H. P. and L. P. diagrams of a compound condensing steam engine to be like when the engine is working at full load under normal conditions. 1

(2) Draw diagrams showing the change in the configuration of the H. P. diagram due to the following causes:—

(*a*) Steam admitted too early.
(*b*) Steam admitted too late.
(*c*) Too much cushioning.
(*d*) Steam port too small.
(*e*) Leaky piston.
(*f*) Release too early.

6. (1) Steam at 150 lbs. per square inch absolute and 3 per cent. wet is throttled down to a pressure of 75 lbs. per square inch (absolute). Find the dryness fraction of the steam after throttling. 13

Temperature corresponding to 150 lbs. per sq. in. 358·3° F.
" " 75 " " " " 307·4° F.

(2) A steam engine which is governed by throttling consumes 1,940 lbs. f water per hour when the Horse Power is 110, and 1,150 lbs. of water hen the Horse Power is 50.

Find the steam consumption when the Horse Power is 5.

7. The travel of a simple slide is $4\frac{1}{2}''$, the outside lap is $1\frac{1}{4}''$ and the outside lead $\frac{1}{4}''$. 13

(*a*) Find by means of a valve diagram the angle of advance, and the cut off, neglecting the obliquity of the connecting rod.

(*b*) If the ratio length of connecting rod to crank is 4 to 1, and if the lap is the same for both forward and backward strokes find the point of cut off for both strokes.

8. (1) What will be the working pressure allowable in a boiler 7′ 6″ dia., plates $\frac{9}{16}$ thick, if the transverse joints are single riveted lap joints, rivets $\frac{3}{4}''$ dia., $1\frac{7}{8}''$ pitch, centre of rivet to edge of plate $1\frac{9}{16}''$. 13

(2) In a lever safety valve the diameter of valve is 3″, distance from centre of valve to fulcrum 4″, distance from centre of gravity of lever to fulcrum 10″, the weight of lever 8 lbs. At what distance from the fulcrum must a weight of 60 lbs. be placed on the lever in order that the valve may blow off at 70 lbs. per square inch by the gauge?

9. Show clearly by means of sketches— 13

(*a*) The setting of a Lancashire boiler in its flues.

(*b*) A Stephenson link motion.

10. (*a*) Show clearly by means of sectional sketches any type of suction gas producer with which you are acquainted. 13

(*b*) The design of a piston for a gas or an oil engine.

WEDNESDAY, 20TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

WATER-SUPPLY AND SANITARY ENGINEERING.

Not more than *four* questions in section I, and *five* in section II, should be attempted.

SECTION I.

1. Distinguish between the intermittent and constant system of town water supplies, and the intermittent and constant system of settlement in settling reservoirs. What are their advantages and disadvantages? 10

Describe the action which takes place in settling reservoirs. How does the temperature of water affect the degree of settlement, and which arrangement of inlets and outlets gives the best results?

2. Calculate by Hawksley's or by any other formula, the size of a main, 5 miles long, required for supplying a town of 40,000 inhabitants (inclusive of future increase) at the rate of 25 gallons per head per day, under a head of 100 feet. Allowance for fluctuations in demand and for fire extinguishing purposes should be made as usual, and a terminal statical head of 56 feet provided for. (The answer may be given in any power of the diameter.) 14

In a water-supply on the pumping system, the engines have to perform the following duty in a day of 8 hours :—

(1) to deliver 60,000 gallons of water into a reservoir 100 feet above the pumps and $1\frac{1}{2}$ miles distant;

(2) to deliver 100,000 gallons of water into a reservoir 60 feet above the pumps and 1 mile distant.

Assuming the size of rising main to be 12 inches in diameter, and the efficiency of the pumping machinery to be 0·7, find the H. P. of the engines required.

3. Describe fully the action sand performs in the purification of water in sand filters. What reasons are there to believe that this action is unlike that of mere straining as by a sieve? What is the essential condition which must be fulfilled in the working of a sand filter to obtain the best results, and explain any method by which this is arranged for in the construction and working of sand filters? 12

Calculate the sizes of filter beds required for the case given in the first part of Question No. 2, it being assumed that the filtered water is stored in service reservoirs.

What is a flood separating weir or jump weir as provided on supply channels of water works? On what principle is it designed?

4. What are service reservoirs and what objects do they serve? What are the essential features of their design and construction, and their usual size? 10

How does the situation of service reservoirs with regard to the town it supplies affect the size of the mains below it?

When the site of a service reservoir is not sufficiently elevated to give the necessary head on the pipes for distribution, what special arrangements of pipes and valves will you provide in such a case to obtain the necessary pressure?

5. Explain the use and working of sluice valves, scour valves, air valves, ball valves, and floating pipes. Mention the different positions where the above valves occur in a system of waterworks. 12

A pipe line has to be laid across the bed of a river which attains a high velocity in floods. Describe a suitable joint for the pipes, and the precautions you would take for the protection of the pipe line.

A gravitating main, from a storage reservoir, enters a low level service reservoir, from which the water passes into an Engine and Pumping House Shew, on a sketch, the relative positions of the storage, and service reservoirs, and the Engine House, and shew on it the positions of the gravitating main, outlets, wash-outs, &c., as also of the various valves and chambers.

6. How is the probable increase of population provided for in water-supply schemes? 12

Shew, by an example, that in the case of a large town of growing importance, it will, generally, be cheaper, in the long run, to provide, on a liberal scale, for larger sizes of pipes, at the outset, than to make the required extensions, subsequently, when the original provision is found to fall short of the requirements. Under what conditions will the case be contrary in any specific instance?

What provision is necessary in this respect, in the case of filter-beds, pumping machinery, and service reservoirs?

Explain briefly the two systems of laying distribution pipes known as the "dead-end," and "gridiron" system, and their relative advantages.

Explain, in general terms, how the sizes of pipes of a town distribution system are determined.

SECTION II.

7. Define "Hydraulic Mean Depth", and shew its application to the design of sewers. 1

8. Describe in detail the method of effecting the drainage of a house by pipes, stating the kind of pipes to be used, the method of jointing, the kinds of traps used, and their positions, and the arrangements made for ventilating the drains. Sketch accurately, and to a large scale, the traps to be employed. 1

9. Draw, accurately, to a large scale, the section of the best form of interceptor trap with which you are acquainted, and state your reasons for adopting this form. 1

10. State concisely (*a*) the advantages, (*b*) the disadvantages, of the use, in drainage works of 1

(1) Bricks, (2) cement, (3) cast iron, (4) steel, (5) stoneware.

11. What are the defects to be anticipated in a badly ventilated room of an Indian dwelling house, and the steps you would take to remedy them? 1

12. Describe fully the best method, with which you are acquainted, of dealing with the sewage of a small town, including its final disposal, and shew its advantages. 1

13. The kuchra of a town has to be disposed of, by fire, at all seasons of the year. Sketch the section of the furnace you would adopt, explain its operation, the advantages of the system, and the scientific principles involved. 1

UNIVERSITY OF BOMBAY

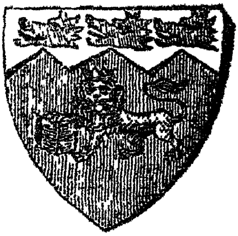
CALENDAR FOR 1913-1914

VOLUME II

EXAMINATION PAPERS

OF

1912-1913



BOMBAY
1913

MATRICULATION EXAMINATION, 1912.

MONDAY, 11TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

ENGLISH (*Compulsory*).

N.B.—(1) Ten marks are assigned for general neatness, style and method.

(2) The two sections are to be answered in separate books.

SECTION I.

1. Paraphrase :—

(*a*) On the green hill top,
Hard by the house of prayer, a modest roof,
And not distinguished from its neighbour-barn,
Save by a slender-tapering length of spire,
The Grandame sleeps. A plain stone barely tells
The name and date to the chance passenger.
For lowly born was she, and long had eat,
Well earned, the bread of service ;—hers was else
A mounting spirit, one that entertained
Scorn of base action, deed dishonourable,
Or aught unseemly. I remember well
Her reverend image ; I remember, too,
With what a zeal she served her master's house.

(*b*) He pays off both scores of old friendship and new acquired enmity in a breath, in one perpetual volley from his pen. However his own reputation or the cause may suffer in consequence, he cares not one pin about that, so that he disables all who oppose, or pretend to help him. In fact, he cannot bear success of any kind, not even of his own views or party ; and if any principle were likely to become popular, would turn against it to show his power in shouldering it on one side. In short, wherever power is, there he is against it ; he naturally butts at all obstacles, and feels his strength only by resistance to the opinions and wishes of the world. To swim with the stream, to agree with the company, is not his humour.

2. Change the form of the following sentences as directed :—

(*a*) The difficulty was solved by means of a special service devised for the occasion.

(*Make the word* 'service' *the subject.*)

(*b*) I left him to his fate. He persisted in refusing help. I offered him help on all occasions. On such occasions he really needed help.

(*Combine into one complex sentence.*)

(*c*) The lady was compelled by the doctor to drink such vile medicine that she was all but killed by him.

(*Use the active voice throughout.*)

3. Express in English *six* proverbs of your own vernacular and explain the exact meaning of each.

5. How would *you* obtain (*a*) potassium, (*b*) chlorine, (*c*) oxygen, from potassium chlorate? 10

How would *you* prepare (*a*) hydrogen, (*b*) nitrogen, from ammonia?

6. How are boric acid and borax obtained on the large scale? Give an account of their appearances, properties and uses. With what other elements is boron classified and what are the reasons for your answer? 10

7. Give an account of the ores and manufacture of (*a*) Tin, (*b*) Mercury. What salts of these metals are of technical importance and for what are they used? With what other elements is each of these metals most closely related and what is the nature of the relation? 10

8. Explain clearly the meaning of the word equivalent and give examples illustrating your answer. 10

1·298 gm. of a metal dissolve in dilute acid and yield 461 cc. of dry hydrogen at 17° C. and 762 mm. pressure. Calculate the equivalent of the metal.

What else would have to be done in order to determine the atomic weight of the metal?

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5 30 P.M.]

PHYSICS—PAPER I.

N.B.—Draw neat diagrams wherever possible.

1. Two bodies start together from the top of a smooth inclined plane. One moves along the plane and the other moves vertically downwards. Compare the spaces passed over by these in time T after the start. 12

Explain how you can use a smooth inclined plane to find the force of gravity at a place.

2. Describe the Fleuss or Geryk pump and explain its working. What are its special advantages? 10

3. A circular disc, having equidistant holes bored near its edge so as to be perpendicular to the plane of the disc, is spun horizontally and an air jet is made to play upon the holes as the plate is spinning. Explain what happens. 12

The interval between two notes is a major fourth and the pitch of the lower note is 384. Find the pitch of the other. Take the higher note as the tonic and find the pitch of the corresponding dominant and sub-dominant.

4. Describe Kundt's method of determining the velocity of sound in gases. 12

Can you explain why the powder collects in different heaps in his apparatus?

5. Show that the absorbing and radiating powers of a substance are equal. 6

6. Explain how you will find the specific heat of a gas at constant volume. 6

7. Explain the difference between saturated and unsaturated vapours and show how the weight of a given volume of moist air can be found. 10

8. Explain what is meant by the efficiency of a heat engine. Define Indicated horse-power and Brake horse-power. How are these determined? 12

THURSDAY, 21ST NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER II.

1 Give a short sketch of Foucault's method for determining the velocity of light. 12

Find the focal length of a double convex lens when the radius of curvature of the two faces is 2 cms. and the refractive index of the glas $\mu = 1{\cdot}5$.

2. Describe and explain polarisation of light. State the relation which exists between the angle of polarisation and the angle of refraction. Find the relation between the index of refraction and the critical angle. 11

3. Prove that the force between two magnetic poles varies inversely as the square of the distance between the poles. 12

The horizontal and vertical components of the earth's magnetic field in Bombay are 0·368 and 0·159 respectively. Hence find the dip in Bombay.

4. Prove that the work done in charging a Leyden jar is given by the equation 12

$$w = \tfrac{1}{2}\,\frac{s}{4\pi t}\,v^2$$

where s = surface of the coating of the jar.
v = potential of the charge.
t = reduced thickness of the insulator.

A spherical conductor of radius 10 cms. has a charge of 160 electrostatic units. Find (*a*) the potential of the charge, (*b*) the electric density on the surface, (*c*) the electric density as the centre.

5. How can the velocity of electricity in a conductor be measured by the discharge of a Leyden battery? 12

Find the potential of the charge on the sphere in question 4, example, when the sphere is completely surrounded by a second concentric sphere of radius 12 cms.

6. Deduce Ohm's law for the strength of a current from the analogy between the flow of electricity and the flow of heat. 12

Let n be the number of cells of a battery, r the internal resistance of each cell, R the external resistance. Prove that if $r = R$ we get the same current whether we connect the cells in series or in parallel.

7. Describe and explain the damping effect of a copper disc on a magnetic needle oscillating over the disc. 6

WEDNESDAY, 20TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

BOTANY—PAPER I.

N.B.—Illustrate your answers by diagrams.

1. Describe the various types of branching met with in plants. 14

2. Describe fully with the aid of a diagram the microscopic structure of an anther, and mention the different ways in which an anther dehisces to liberate the pollen grains. 14

3. Describe the different kinds of indefinite inflorescence (*a*) with an elongated primary axis, and (*b*) with a dilated, fleshy axis, giving examples. 14

4. Classify and describe fully the following fruits, giving an example of each :— 12

Capsule, follicle, drupe, caryopsis, syconus, sorosis.

5. Describe the various methods in which plants reproduce themselves asexually, giving examples. 14

6. Give the general characters of the natural orders Malvaceæ, Asclepiadaceæ, Liliaceæ, and name a few plants belonging to each. 12

THURSDAY, 21ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

BOTANY—PAPER II.

N.B.—Illustrate your answers by diagrams.

1. Give the microscopic structure, the composition, and the physical and chemical characters of starch. 14

2. Describe the structure and development of a sieve-tube. Where does it occur and what is its probable function? 12

3. Describe fully the microscopic structure of the stem of an old dicotyledonous plant, and trace the longitudinal course of the vascular bundles in it, explaining fully the significance of the terms common and cauline bundles. 14

4. Give an account of the process of absorption of water from the soil by the root In what essential respects does this process differ from the physical process of osmosis? 14

5. Describe the phenomenon of respiration in plants. 12

6. Give an account of the structure and life-history of Mucor. What is its place in the vegetable kingdom? 14

MONDAY, 18TH NOVEMBER.

[2 30 P.M. TO 5-30 P.M.]

ZOOLOGY—PAPER I.

N.B.—Answers to be illustrated by diagrams.

1. Compare and contrast the circulatory systems of the Lobster and the Earthworm. 10

2. Describe the microscopic structure of a striated muscle, and compare it with that of a non-striated one. 10

3. Describe the secretory organs of an Earthworm. 10

4. Give a diagrammatic representation of the transverse section of the thorax of a Crayfish. 10

5 Give an account of the various methods of reproduction of Vorticella. 10

6 What do you know of the microscopic structure of a typical animal cell? 10

7. Name and describe the parts and organs that are found in connection with the head of a Cockroach. 10

8. Give a description of the reproductive organs of a typical Gasteropod. 10

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ZOOLOGY—PAPER II.

N.B.—Answers to be illustrated by diagrams.

1. Write what you know of the urino-genital organs of the Dogfish. 10

2. What is cœlom? Compare the cœlomic cavities of an Earthworm, Lobster, and Frog. 10

3. State the main features distinguishing the Reptilian skull from that of an Amphibian. 10

4. Give an account of the urogenital organs of the male Frog. 10

5. Describe the alimentary canal of a graminivorous Bird. 10

6. Compare the brain of a Bird with that of a Rabbit. 10

7. Give a short account of the arterial arches of Amphibians, Birds, and Mammals. 10

8. Describe the various kinds of epithelial tissue and mention where they are found in the animal body. 10

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER I.

(*Gibbon.*)

N.B.—Not more than six questions to be attempted.

Equal marks are assigned to each question.

1. Describe the events which led to the accession of Septimius Severus and form an estimate of him as warrior and statesman.

2. "His (Aurelian's) reign lasted only four years and nine months, but every moment of that short period was filled by some memorable achievement." Illustrate the statement as fully as you can.

3. State and criticise the position taken up by Gibbon in regard to the causes of the Christian persecutions, and describe the attitude of Nero, Trajan and Diocletian towards the new faith.

4. What do you think of Julian the Apostate as a man, a ruler and a philosopher?

5. Write a note on the origin and early history of the Huns and relate the exploits of their terrible chief Attila.

6. Tell the story of the conquest of Africa by the Vandals *or* of its reconquest by Belisarius.

7. Write short notes on any three of the following:—

The Empress Theodora, Archbishop Ambrose of Milan, John Chrysostom, Procopius the historian, Bœthius.

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER II.

(*Gibbon.*)

N.B.—Not more than six questions are to be attempted.

(Equal marks are assigned to each question.)

1. What was the iconoclastic controversy? How did it materially affect the decline and fall of the Roman Empire?

2. Describe and account for the rapid expansion of the Saracen power from the death of Mohammed to the battle of Tours.

3. (*a*) Explain the importance of the pontificate of Gregory VII.

(*b*) What was the political heresy of Arnold of Brescia?

4. Trace the influence of the Crusades (*a*) on the Papacy, (*b*) on Society, (*c*) on the intellectual life of Europe.

5. Give an account of the career and character of Robert Guiscard.

6. (*a*) What were the services rendered by Nicholas V. and Cosmo de Medici to the revival of Greek learning in the western world?

(*b*) Describe the events known as the Poetical Coronation of Petrarch.

7. How do you account for the protracted existence of the Eastern Empire?

8. Write brief notes on the following:—

(*a*) The Hanseatic League.
(*b*) Charles Martel.
(*c*) The Janizaries.
(*d*) Haroon-al-Rasheed.

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER III.

(*Bryce.*)

N.B.—Only *six* questions are to be attempted. Equal marks are assigned to each question.

1. What was the attitude of the Teutonic invaders towards the Empire and the Church, and how do you account for it?

2. Summarise the events which led to the election of Charlemagne as Emperor and discuss the theories of contemporary and later medieval writers regarding the same event.

3 Sketch the career of Frederick Barbarossa pointing out in particular the causes of his wars with the popes and the Italian cities.

4 Give an account of the medieval ideas that made the continued existence of the Empire appear a matter of necessity.

5. By what successive steps did the seven Electors acquire the exclusive right of choosing the emperor?

6. Show how the peculiarities of the German constitution were the result of the connection between the Empire and the German kingdom.

7. Examine the political influence of the Reformation on the Empire.

8. Write brief notes on the Concordat of Worms and Dante's political views.

THURSDAY, 21ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY (*Voluntary*)—PAPER IV.

(*Guizot.*)

N.B.—Equal marks are assigned to each question.

1. Describe the chief elements which the Teutons contributed to civilisation. Discuss the relative importance of the Classical and Teutonic elements in the history of European civilisation.

2. What was the social and political condition of Europe in the 5th century? State what you know of the attempts at organisation in France in the 8th and 9th centuries.

3. Discuss the influence of the Church in the Middle Ages upon European civilisation.

4. Give an account of the condition of the towns after the fall of the Western Empire, and of the circumstances which led to the revival of town life in the 11th and 12th centuries.

5. "Diplomacy in Europe dates from the fifteenth century." Illustrate this remark in the light of the reign of Louis XI of France.

6. Describe and comment upon Guizot's view of the French Monarchy under Louis XIV.

V.

INTERMEDIATE SCIENCE EXAMINATION.

EXAMINERS.

The Rev. J. Devine, S.J.	In English.
The Rev. John McKenzie, M.A.	
R. P. Paranjpye, B.Sc., M.A.	In Mathematics.
John Maclean, M.A., B.Sc.	
Chas. J. J. Fox, B.Sc., Ph.D.	In Chemistry.
Alex. R. Normand, M.A., B.Sc.	
K. R. Kanitkar, M.A., B.Sc.	In Physics.
The Rev. A. Steichen, S.J.	
A. M. Masani, M.A., B.Sc.	In Biology.
V. N. Hate, B.Sc.	
The Rev. J. Assmuth, S.J.	
J. P. Mullan, M.A.	

Wednesday, 30th October.

[10-30 a.m. to 1-30 p.m.]

ENGLISH (*Text Books*).

[*The same as that set for the Intermediate Arts Examination, see pages 59 and 60.*]

Friday, 1st November.

[2-30 p.m. to 5-30 p.m.]

ENGLISH (*Composition*).

[*The same as that set for the Intermediate Arts Examination, see page 61.*]

Wednesday, 30th October.

[2-30 p.m. to 5-30 p.m.]

TRIGONOMETRY.

[*The same as that set for the Intermediate Arts Examination, see pages 78—81.*]

FRIDAY, 1ST NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

STATICS.

N. B.—Arrange your answers in two sections.

SECTION I.

1. Show how to resolve a force into components along two given directions, and use Lami's Theorem to get formulæ for these components. What horizontal force is required to keep a body at rest on a smooth inclined plane? 10

A sphere of radius a and weight W is attached to a point in a smooth vertical wall by a string of length b; find the tension of the string and the pressure on the wall.

2. Enunciate the Polygon of Forces, and show how it may be used to find the resultant of a number of concurrent forces. Explain also the method of getting the resultant by considering the resolved parts of the forces in two directions at right angles. 10

ABC is an equilateral triangle in which AD is perpendicular to BC. Forces acting at a point are represented in magnitude and direction by $2AD$, $3BA$, CB, AC. Find the magnitude and direction of their resultant by both methods mentioned above.

3. Define a couple. What is the characteristic property of couples? Prove that a couple and a force acting in the same plane are equivalent to a single force. 9

Three forces act along the sides of a triangular lamina and are proportional to the sides along which they act: find the magnitude of their resultant.

4. Prove that the moment of the resultant of two unlike parallel forces about any point is equal to the sum of the moments of the forces about that point. What is meant by the centre of a system of parallel forces? 9

A small steelyard 20″ long is graduated for 18″ from one end so as to weigh up to 16 lbs. If the weights are hung from the other end and the running weight is 1 lb., find the position of the fulcrum. Where is the centre of the weights when the steelyard is fully loaded, and also when it registers 12 lbs.?

5. Prove that if the sums of the moments of any system of forces in a plane about three points not in the same straight line are zero, the forces are in equilibrium. 10

A small ring of weight W slides on a smooth vertical hoop. A string of a length three-quarters of the diameter of the hoop has one end fastened to the ring and the other to the highest point of the hoop. When the string is tight find its tension.

SECTION II.

6. Prove that the weight of a triangular lamina is equivalent to three weights at its corners equal to one-third of the weight of the lamina. 8

Find the C.G. of equal masses at five of the vertices of a regular hexagon.

7. If the C.G. of a complete body is known and also the C.G. of a portion removed, how is the C.G. of the remainder determined? 13

$ABCD$ is a uniform square lamina: E and F are the mid-points of AB and BC. The corner EBF of the square is now cut off, and the lamina suspended from the angular point A. Find the tangent of the angle which AD makes with the vertical in the position of equilibrium.

8. A weight W is supported on an inclined plane which makes an angle a with the horizon by a force acting at an angle β to the plane. Find the greatest and least possible values of this force and show that their difference is 8

$$2W \frac{\cos(a+\beta)\sin 2\lambda}{\cos 2\beta + \cos 2\lambda},$$

where λ is the angle of friction.

9. Find the relation between the power and the weight in the first system of pulleys with n heavy pulleys. 12

A man of weight 140 lbs. supports himself in a seat of 4 lbs weight suspended from two moveable pulleys of 2 lbs. weight each. With what force must he pull the rope passing over the fixed pulley?

10. What are the essentials of a good balance? State how these may be secured. If a balance has unequal arms, how may the true weight of a body be found? 11

A shopkeeper uses a balance with unequal arms a and b. If he weighs out two apparent weights W of an article, using first one pan and then the other for the weights, find how much he gains or loses.

THURSDAY, 31ST OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

CHEMISTRY—PAPER I.

N.B.—Equations and diagrams to be given where possible.

1. What is the effect of adding strong sulphuric acid to (a) potassium perchlorate, (b) potassium chlorate, (c) potassium iodide, (d) potassium chloride, (e) potassium bichromate? Give equations. 12

2. Why is the formula P_4O_6 given to phosphorus trioxide? Discuss the cases of any other instances with which you may be acquainted, similarly involving the use of formulæ representing some multiple of the simplest possible molecular weight, in each case. 13

3. Describe two methods of preparing sulphur dioxide. What is the action of sulphur dioxide on aqueous solutions of chlorine, iodine and sulphuretted hydrogen? 12

4. What are the common natural sources of bromine and iodine and how are these elements extracted? 13

Explain why their hydrogen compounds cannot be obtained in the pure state by the method used to obtain hydrochloric acid.

5. By the action of arsenious oxide on strong nitric acid a deep brown gas is produced which gives nitrites when dissolved in ice cold alkalies and with air-free cold water nitrous acid. The residue left after the action of the acid on the arsenious acid gives sodium arsenate when neutralized by sodium carbonate and evaporated to dryness. 13

Discuss how these facts may be combined together to form an equation to represent the reaction.

6. Give an account of the preparation and properties of the element silicon and of its halogen compounds. With what other elements is silicon classed and what are the reasons for that classification? 12

7. What is the raw material from which potassium salts are usually obtained? Describe how potassium carbonate, caustic potash and potassium nitrate are obtained from it commercially. 12

8. 3·000 grams of magnesite ($MgCO_3$) were added to 5 cc. of dilute sulphuric acid: after the action had ceased 0·480 gram magnesite was left undissolved; calculate the number of grams of H_2SO_4 per litre of the dilute acid. 13

In this reaction what volume of CO_2 would be evolved measured at 27° C. and 750 mm.?

$Mg = 24,\ C = 12,\ O = 16,\ H = 1,\ S = 32.$

SATURDAY, 2ND NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY—PAPER II.

N.B.—Equations and diagrams of apparatus to be given where possible.

1. Describe the commercial preparation of bleaching powder. For what purposes is it used? What is supposed to be the composition of bleaching powder? How is the bleaching action explained? 13

What change would you expect to take place if bleaching powder were dissolved in water and the solution boiled? How would you in the laboratory test the correctness of your supposition?

2. Give an account of the ores and manufacture of copper. What compounds of copper are of technical importance and for what purposes are they used? 12

How would you proceed to obtain a crystallised specimen of silver nitrate from a silver coin (alloy of silver and copper)?

3. Write a short account of the hydrolysis of salts. Choose as particular cases for discussion, salts that have been met with in your practical course. 13

4. What is the most important mineral source of tin? How is the metal obtained from that source? 12

What is the action on tin of (1) hydrochloric acid, (2) nitric acid, (3) sulphuric acid?

Explain the difference observed in the rate of rusting of (1) tin plate (iron coated with tin), (2) galvanised iron (iron coated with zinc), (3) ordinary iron.

5. For what purposes is manganese dioxide used? 13

How is potassium permanganate manufactured? What is the action of an acidified solution of potassium permanganate on a solution of ferrous sulphate?

Calculate the weight of potassium permanganate required to interact with one gram of ferrous sulphate.

6. How is ammonium sulphide solution prepared and for what purpose is it used in the laboratory? 12

What is the action of ammonium sulphide solution on solutions of (1) hydrochloric acid, (2) lead nitrate, (3) arsenious acid, (4) stannic chloride, (5) nickel sulphate?

7. Describe the preparation and uses of ferrous sulphate. 13

What change is observed when ferrous sulphate is exposed to the air for a long time? What results when the product is strongly heated?

8. Barium oxide is made by heating the nitrate from the naturally occurring carbonate. What are the least quantities of the carbonate and of nitric acid that can be used to yield 500 grams of barium oxide? 12

$Ba = 137$, $H = 1$, $N = 14$, $O = 16$, $C = 12$, $K = 39$, $Mn = 55$, $Fe = 56$, $S = 32$.

SATURDAY, 2ND NOVEMBER.

[2 30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER I.

1. A body is moving in a circle of radius r with a uniform velocity. It is said to possess normal acceleration. Find its value and explain how it affects the velocity of the body. 14

A coin is put near the centre of a circular piece of cardboard which is turned round in a horizontal plane by a turning wheel with uniform velocity. Trace the path of the coin on the cardboard.

2. Explain the circumstances under which a body floats in a liquid and shew under what circumstances is the equilibrium of a floating body stable. 13

A sphere of cork is attached to a cube of platinum. Under what condition can this compound body be just supported in water, it being given the S G. of plantinum is 22·07 and that of cork is 0·24?

3. Explain what causes affect the force of gravity at different places on the surface of the Earth. 13

4. Define a musical interval, a harmonic triad and a major chord. 12

The note produced by the whistle of the locomotive of a railway train is found to be the minor sixth of that of a string stretched on a monochord. Find the pitch of the whistle when it is known that the note of the string is in unison with the major third of a tuning fork of 256 vibrations.

5. Explain how you can produce Konig's manometric flames. What is the function of the mirror used? 12

Can you prove with the help of these flames whether a given note is simple or compound?

How can you shew the presence of nodes and loops in an organ-pipe with the help of these flames?

Is there any difference between the waves produced in the air in the inside and outside of an organ-pipe when it is sounding?

6 Describe Victor Meyer's method of finding the vapour density of a liquid. Prove the formula. 12

7. How is the pressure exerted by a gas on the sides of a vessel enclosing it, accounted for on the Dynamical theory of gases? Can you prove Avogadro's law with its help? 12

8. Describe Regnault's method of determining the vapour pressure of water above and below 100°C. 12

MONDAY, 4TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHYSICS—PAPER II.

1. A ray of monochromatic light falls on a prism. If the refracting angle is A and the angle of incidence is i find the angle of minimum deviation of the ray. Hence find an expression for the refractive index of the prism in terms of the refracting angle and the angle of minimum deviation. 14

An object 2 cms. high is placed vertically on the principal axis of a concave mirror at a distance of 25 cms. from the centre of the mirror. The radius of curvature of the mirror is 1m. Find the nature, size and position of the image.

2. Describe the phenomenon of double refraction in a uniaxial crystal, the law of refraction and the polarisation of the two rays. 5

3. If μ denotes the coefficient of magnetic permeability of a substance and k the coefficient of magnetic susceptibility prove that 14

$$\mu = 1 + 4\pi k.$$

Two long bar magnets of pole strengths m_1 and m_2 are placed in a straight line, their like poles being opposite each other. d is the distance between the two like poles. Find the point on the line joining the two poles where a small iron ball will remain at rest under the attraction of the two poles.

4. How is the horizontal component of the earth's magnetic force determined in absolute measure? 1[illegible]

At a place A the total magnetic intensity is 0·5 and the dip is 64°: at a place B the total intensity is 0·6 and the dip is 72°. If a magnet vibrating horizontally at A makes 20 oscillations in a minute how many oscillations would it make in the same time at B?

5. Explain what is meant by an electric field, a line of force, an equipotential surface and draw the lines of force of a single charged particle, of two particles with equal and like charges and of two particles with equal but unlike charges. 14

Unit positive charge is placed at the point of intersection of the diagonals of a rectangle whose sides are 3 and 4 cms. respectively. Find the resultant force on the charge if charges -6, $+8$, $+10$, -12 are placed at the successive corners of the rectangle. Draw the figure.

6. A number of cells and an external resistance are given. How must the cells be arranged so that the current may be a maximum? Prove your statement. 16

The poles of a battery, whose internal resistance is equal to 2 ohms and whose E.M.F. is equal to 200 volts are connected by a wire. A current of 10 ampères passes through the wire. The specific resistance of the wire is 2 mikrohms, the area of the cross-section of the wire is 1 mm^2. Find the length of the wire.

7. What are the laws followed by two parallel electric currents acting upon one another and how are they proved? 17

The poles of a Grove's cell whose E. M. F. is 1·9 volts and internal resistance is 0·4 ohms, are connected first by means of a wire whose resistance is 3 ohms, then by means of a wire whose resistance is 30 ohms. Find the ratio of the heats produced by the currents in the two arrangements.

[illegible]

THURSDAY, 31ST OCTOBER.
[10-30 A.M. TO 1-30 P.M.]

BIOLOGY.

N.B.—The answers to the two sections should be written in separate books.

SECTION I

1. Give an account of the structure and life-history of Fucus. 12

2. Describe fully the phenomenon of Carbon-assimilation. 13

3. Describe fully the forms and occurrence of the Tracheal tissue. 12

4. Describe in detail the microscopic structure of a typical Angiospermous ovule before fertilization, and mention the different forms of ovules found in Angiosperms. 13

SECTION II.

5. Give a short account of the mode of feeding, growth and metabolism of Amœba. 15

6. Describe the alimentary canal of a Spiny Lobster. State the functions which the various parts of the canal perform in the digestion of food. 10

7. Describe the general structure of the heart of a Frog, and give the mechanism which ensures the passage of blood in the right direction. 15

8. Describe the structure of the ovum of Amphioxus and the mode of its segmentation. Give an account of the stages of development up to the formation of the embryo. 10

VI.

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE.

EXAMINERS.

R. P. PARANJPYE, B.Sc., M.A. ... ... JOHN MACLEAN, M.A., B.Sc.	In Mathematics.
K. R. KANITKAR, M.A., B.Sc. ... . The Rev. A STEICHEN, S.J.	In Physics.
CHAS. J. J. FOX, B.Sc., PH.D. ... ..., ... ALEX. R. NORMAND, M.A., B.Sc.	In Chemistry.
V. N. HATE, B.Sc. ... ... J. P. MULLAN, M.A.	In Botany.
M. K. KANGA, M.A., B.Sc., L.M. & S. ... ... H. M. PAGE, F.I.C., F.G.S.	In Geology and Mining.
Major L. T. R. HUTCHINSON, M.D., B.C., D.P.H., D.T.M., I M. S. ... ... R. ROW, M.D., D.Sc.	In Animal Physiology.

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ANALYTICAL GEOMETRY AND HYDROSTATICS.

[*The same as that set for the B.A. Examination, see pages 130—132.*]

TUESDAY, 19TH NOVEMBER.

[2-30 P.M TO 5-30 P.M.]

ALGEBRA, TRIGONOMETRY AND SOLID GEOMETRY.

[*The same as that set for the B.A. Examination, see pages 132 and 133.*]

WEDNESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

DIFFERENTIAL AND INTEGRAL CALCULUS.

[*The same as that set for the B.A. Examination, see pages 134—136.*]

THURSDAY, 21ST NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

STATICS AND DYNAMICS.

N.B.—Not more than eight questions should be attempted.

1. Enunciate the proposition known as the parallelogram of forces; and assuming it true for the direction of the resultant, prove it for the magnitude. 7

A particle is repelled by two equal forces P tending from two fixed points distant $2a$ apart and is attracted by a force Q tending to a point equidistant from them. Show that, if equilibrium is possible, the particle will remain at rest anywhere on an arc of a certain circle the radius of which is $a\dfrac{4P^2}{Q\sqrt{4P^2-Q^2}}$.

2. Show analytically that a system of coplanar forces can be reduced to a force at a given point and a couple. Explain how the magnitude of this couple alters by changing the point of reference. 11

Two uniform rods of the same material and thickness are connected at their middle points by a pin which allows free motion in a vertical plane. They stand upon a smooth horizontal plane and their upper extremities are connected by a fine string. If θ be the angle the direction of the action at the hinge makes with the horizon, and a, β the inclinations of the beams to the horizon, prove that $\tan\theta = \tan\dfrac{a-\beta}{2}(1+\sec a\sec\beta)$.

3. Obtain formulæ for finding out the centre of gravity of an area and use them to obtain the centre of gravity of a semicircle. 13

Find the centre of gravity of the portion of a parabolic lamina bounded by the curve, the axis and the latus rectum, the density at any point being proportional to the product of the distances of the point from the latus rectum and the axis.

4. Prove that the chords of a vertical circle starting from its highest point are all described by bodies falling along them in the same time. If the bodies after describing these chords proceed to describe free parabolas, find the locus of their foci. 10

The chord of quickest descent OP to a parabola whose axis is vertical and vertex upwards is drawn from a point O on the axis between the vertex and the focus S. Show that the angle OSP is four times the angle OP makes with the horizon.

5. Explain what is meant by relative velocity and relative acceleration; given the velocities and accelerations of two moving points in magnitude and direction, show how to construct their relative velocities and accelerations. 9

Two points describe, in opposite directions, concentric circles of radii a and b with velocities inversely as the radii, show that the relative velocity is parallel to the line joining the points when the angle between the radii is $\cos^{-1}\dfrac{2ab}{a^2+b^2}$.

6. Prove the formula $P = mf$ and determine the motion when two masses m and m' hang by a weightless string over a smooth pulley. 8

In an Atwood's machine supposing the friction at the pulley is a constant force independent of the mass moved, show how by observations with riders of different weights to determine a value of g corrected for this friction.

7. Prove that the path of a projectile in a vacuum is a parabola. From the equation of the path, deduce the range on an inclined plane through the point of projection. 8

Prove that if this range is a maximum for a given velocity, the focus of the path will lie in the inclined plane.

8. An imperfectly elastic body impinges on a fixed plane, find the motion after impact. 11

A number of particles are let fall from a horizontal straight line upon the convex arc of a fixed vertical parabola whose directrix is the given line. Show that the parabolas which they describe after impact on the curve have a common directrix at a distance $a\ (1 - e^2)$ below the given line, where $4a$ is the latus rectum of the given parabola and e the coefficient of restitution between the particles and the curve.

9. Obtain expressions for the radial and transversal accelerations of a point moving in a plane. 11

A particle is fastened to the free end of a light inelastic string which is coiled round a circular hoop fixed on a smooth horizontal plane; if the string be stretched and the particle projected at right angles to the free part, prove that $s^2 = b^2 + 2aVT$ where V is the velocity of projection, s is the free length of the string at time T, b the initial value of s, and a the radius of the hoop.

10. Show that if a conic be described under the action of a force perpendicular to an axis, the force must be proportional to the inverse cube of the distance from that axis. 13

If a particle be acted upon by a force always parallel to the axis of y and proportional to the square of the radius of curvature at the point, prove that it will describe the curve

$$\frac{y-b}{a} = \log \sec \frac{x}{a},$$

the particle moving parallel to the axis of x at the point (a, b) [it is given that the radius of curvature $= \dfrac{ds}{d\psi}$ with the usual meanings for s and ψ].

11. A body is describing an ellipse about a centre of force in the focus. Investigate a formula for finding the true anomaly at any instant, neglecting powers of e above the third. 1

Determine, in terms of the eccentricity of a planet's orbit, the ratio of the times of moving over the two parts in which the orbit is divided by the latus rectum which passes through the Sun's centre, and give a rough approximation to the value of this ratio when $e = \frac{1}{5}$.

12. Show that the time of oscillation of a simple pendulum is independent of the arc (supposed small) of oscillation. If the angle $(2a)$ of oscillation cannot be altogether neglected, but all its powers higher than the second can, find the time of oscillation. 1

Two small heavy rings of equal mass connected by a weightless rod of length $2a \sin a$ oscillate on a smooth circular vertical wire of radius a. Shew that the motion is the same as that of a simple pendulum of length $a \sec a$.

WEDNESDAY, 20TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PHYSICS—PAPER I.

1. What is the difference between Kinetics and Kinematics? Define "the degrees of freedom" and show how many "degrees of freedom" a particle can have and how these can be restricted. 18

State and explain the number of the "degrees of freedom" left to a rigid body in the following cases:—

(*a*) One point in the body fixed.

(*b*) One line in the body fixed.

(*c*) One surface in the body fixed.

(*d*) A point in the body restricted to move along a line.

(*e*) A line in the body made to coincide with some part of a given line.

(*f*) A point in the body restricted to a given surface.

(*g*) A line in the body restricted to a given surface.

(*h*) Three points in a body restricted to a surface.

2. Explain the following terms:— 18

Moment of Inertia,
Radius of Gyration,
Angular Momentum,
Moment of Momentum,
Centre of Oscillation;

and enumerate the properties of the centre of Oscillation.

Shew how some of these properties help in finding the force of gravity at a place very accurately.

3. Explain fully the method of finding the modulus of torsion of a wire by Maxwell's needle. 12

4. State Torricelli's law for the flow of liquids and explain what is meant by the velocity head and the pressure head in the case of the flow of liquids. 12

Give four methods of measuring the velocity of a stream.

5. Explain clearly how stationary waves are produced and cite instances where you get longitudinal and transverse stationary waves. 10

Explain how a tuning fork can be used to find "g" at a place.

6. Give an account of Professor James Thomson's hypothesis in connection with the isothermals of a gas below its critical point, and shew how it is very useful in explaining some well-known phenomena. 8

7. Describe Clement and Desormes method of determining the ratio of the two specific heats of a gas. Explain the theory of the experiment. 12

8. Enunciate the second law of Thermodynamics. Prove Carnot's theorem that "All reversible heat engines possess the same efficiency when absorbing and rejecting heat at the same two temperatures". 10

THURSDAY, 21ST NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PHYSICS—PAPER II.

1. Show that the rectilinear propagation of light is consistent with the wave theory of light. 11

2. Prove from the stand-point of the wave theory the laws of reflection of a ray of light from a plane surface. 11

3. Describe elliptic and circular polarisation of light. How can we detect circularly and elliptically polarised light? 11

4. Prove that the total normal electric induction over any closed surface drawn in the electric field is equal to 4π times the total charge of electricity inside the closed surface. Hence show that the intensity at a point outside a uniformly electrified sphere is the same as if the charge on the sphere was concentrated at the centre, and that the electric intensity at any point inside a uniformly electrified spherical shell vanishes. 16

5. Describe Lord Kelvin's Quadrant Electrometer and prove that 16

$$m\theta = n(B - A)\left\{C - \tfrac{1}{2}(A + B)\right\}$$

where $m\theta$ = couple of the needle when deflected, n = some constant, A = potential of one pair of quadrants, B = potential of the other pair of quadrants, C = potential of the needle.

What is the advantage of this instrument over the attracted disc electrometer?

6. Find the magnetic force due to a small magnet at any point. 10

7. Explain what is meant by self-induction and find an expression connecting the inductance of the circuit with the reluctance. Explain the meaning of the term reluctance. How is the coefficient of self-induction determined and what is the energy of the magnetic field surrounding the current? 13

8. Describe how a rotatory magnetic field may be produced and how it is made use of in motors. 12

MONDAY, 18TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY—PAPER I.

1. Ammonium chloride, mercurous chloride, phosphorus pentachloride are said to have abnormal vapour densities. State as far as you know them the facts about the densities of the vapours of these substances and explain why the densities are considered abnormal. State the experimental evidence in support of the explanations you give for these abnormal vapour densities. 13

2. From what mineral source are molybdenum and its compounds obtained? Describe the methods of preparing (1) molybdenum, (2) ammonium molybdate. What is the chemical action that takes place when 12

3. A concentrated solution of stannous chloride is poured into a beaker and on to the top of it, without mixing, a dilute solution of stannous chloride is poured. A rod of tin is suspended in the solutions in such a way that the separation boundary of the two solutions is about half way up the rod. On standing for a day or two it is found that crystals of tin form at the lower end of the rod. 13

Suggest an explanation of this phenomenon.

4. The heat of formation of carbon dioxide is 96,000 cal. When 24·32 grammes of magnesium are burned in carbon dioxide, carbon and magnesium oxide are formed and 47,000 cal. are evolved. Calculate the heat of formation of magnesium oxide. 12

5. (*a*) Describe any methods known to you for obtaining on a commercial scale nitrogen compounds from the nitrogen of the air. 13

or, as an alternative

(*b*) 11·454 grammes of phosphorus trichloride exactly precipitate 26·978 grammes of silver as silver chloride. Calculate the equivalent of phosphorus from these numbers and describe how you would then have to proceed if you wished to decide upon what is the atomic weight of phosphorus.

6. Describe the preparation of (1) sodium sulphate, (2) sodium bisulphite, (3) sodium thiosulphate, (4) sodium persulphate. For what purposes are these used? 12

7. What is the object in using in chemical analysis (*a*) solution of ammonium chloride + ammonium hydroxide, (*b*) solution of sodium acetate + acetic acid? State briefly but clearly the principles you employ in your explanation. 13

8. Describe the action of hydrochloric acid, hot and cold, upon the following peroxides:—MnO_2, PbO_2, BaO_2, Na_2O_2. With the help of the results of these experiments and any other evidence of which you have knowledge, discuss the constitution of these peroxides. 12

$Cl = 35{\cdot}46$, $Mg = 24{\cdot}32$, $Ag = 107{\cdot}88$.

TUESDAY, 19TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

CHEMISTRY—PAPER II.

N.B.—Equations and diagrams of apparatus to be given where possible.

1. You are given what is said to be butyl alcohol. Describe the reactions you would employ in order to decide conclusively whether the sample given you is a primary, secondary or tertiary alcohol. 12

2. How are the alkyl cyanides and isocyanides prepared? What are the experimental facts which determine the formula to be ascribed to each class? 13

3. Give an account of the preparation, properties and constitution of acetoacetic ester. Describe the uses of this substance in organic synthesis. 12

4. Describe the preparation of aniline. 13

How would you prepare the three nitranilines?

What is the "diazo" reaction? Show how it is used in the preparation of hydrocarbons, phenols and halogen substitution-products.

5. Write a brief account of camphor and the terpenes, describing the relationship of camphor to camphene and pinene. 12

6. Describe the preparation of salicylic acid from phenol. How would you convert naphthalene to salicylic acid, and salicylic acid to (*a*) phenol, (*b*) benzene, (*c*) benzoic acid? 13

7. Give an account of the preparation and constitution of alizarin. How is the dye applied to cotton? What is the meaning of the terms "lake" and "mordant"? 12

8. A hydrocarbon of the formula $C_8 H_{10}$ yields on oxidation a colourless crystalline dibasic acid, containing 57·8 per cent. of carbon, 3·6 per cent. of hydrogen. The silver salt of this acid contains 56·8 per cent. of silver. On heating the acid to 213° C. it is converted into a compound of the formula $C_8 H_4 O_3$. On distilling the acid with lime, benzene is formed. Discuss the constitution of the original hydrocarbon. 13

$$C = 12, H = 1, Ag = 108.$$

WEDNESDAY, 20TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

BOTANY—PAPER I.

N.B.—Illustrate your answers by diagrams.

1. Give an account of the different forms of symmetry exhibited by the plant body and its members. 15

2. Describe the different modes of arrangement of lateral members on a common axis and explain the significance of the terms, divergence, orthostichies, parastichies, genetic spiral and cycle used in connection therewith. 20

3. Classify and describe the fruits of the following plants:— 20

Custard-apple, Castor-oil, Strawberry, Apple, Cucumber, Pine-apple, Fig, Pea, Coco-nut, Guava.

4. How are Algæ classified? Trace the evolution of sex exhibited by Algæ, giving examples. 15

5. Describe the development and structure of the sporophyte of the moss plant, and trace the alternation of generations exhibited in the life-history of Mosses. 15

6. Give the general characters of the natural orders Passifloraceæ, Rubiaceæ, Graminaceæ. Name some plants belonging to each. Discuss their affinities with allied orders. 15

THURSDAY, 21ST NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

BOTANY—PAPER II.

N.B.—Illustrate your answers by diagrams.

1. Describe in detail the miscroscopic structure of the nucleus of a vegetable cell, and give an account of the process of Karyokinesis. 15

2. Give an account of the nature, origin, contents and function of the laticiferous tissue, mentioning the natural orders in which their different forms occur. 15

3. Describe the microscopic structure of a very young dicotyledonous root, and mention the changes that take place in it as the root advances in age. How are lateral members developed from it? 15

4. Describe the enzymes or unorganised ferments present in different plants and give a detailed account of the action of each. 20

5. Describe fully the mode of absorption of nitrogen from without in the plant body, and explain fully why certain Papilionaceous plants are able to grow and flourish in soils from which all traces of nitrogen have been carefully removed. 20

6. Describe fully the mechanism of movements and the mode of transmission of stimuli in the case of the leaf of Mimosa pudica. 15

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHYSICAL GEOGRAPHY AND GEOLOGY—PAPER I.

1. Distinguish between the effects of selective diffusion and selective absorption produced by the earth's atmosphere? Why is it that the sun appears to be more red at sunset than it is at noon? How do you account for the larger appearance of the moon at rising than when overhead? 10

2. What are clouds, fog, and hail? What is the cause of the difference in the amount of rainfall according to latitude and altitude? What is the effect of steeply rising mountains on the rainfall? How does the rainfall vary from coast to interior and why? 10

3. Explain with a figure the Millerian system of notation used in Crystallography and state the law of Rational Indices in accordance with the system. 13

4. What are the general characters of the Felspars? 15

Name their two chief types.

Give the chief properties of the following minerals :—

Mascagnine, Carnallite, Periclase, Beauxite, Wavellite, and Oligoclase.

5. Give a short account of the leading features of the Gneissose rocks of India. What evidence is there to show that they belong to two or more distinct systems differing in age from each other? Give the principal points of contrast, both structural and mineralogical, between the two Gneissic series. 15

6. Distinguish between fissures and faults in rocks. What are dip-faults and strike-faults? Explain, with figures, how the existence of unseen faults may usually be determined by an examination of the geological structure of a district. 12

7. Give a definition of metamorphism. 12

Explain the production of the following illustrative examples of metamorphism :—

(1) Marmarosis.

(2) Dolomitisation.

(3) Conversion of vegetable substance into coal.

(4) Production of the schistose structure.

8. What is the full scope of Palæontology? What are the three 13 leading types to which the condition in which the organic remains have been entombed and mineralised may be reduced? What are the two main purposes served by the study of Fossils in geological research?

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

GEOLOGY—PAPER II.

1. Compare tidal waves with wind waves. What is a tidal bore, and 10 what are the conditions which lead to its production?

Describe the effects produced on the motions of the earth and moon by tidal action.

2. Describe one form of sunshine recorder, and state how it is used. 10 What are the chief causes which determine the amount of sunshine recorded at any place?

How is the amount of radiant energy received from the Sun actually measured?

3. What are pseudomorphs? Describe the several ways in which they 10 are formed.

Explain the terms:—intercepts, parameters, zones, interfacial angle, twin crystals, pinacoids and ground form.

How are interfacial angles measured?

4. Give the systematic position in the Animal Kingdom, and range in 14 time of the following fossils:—Paradoxides, Lepidodendron, Coccosteus, Ptilopora, Telerpeton, Productus, Encrinus, Scaphaspis, Pterygotus, Orthoceras, Spirifer, Lithostrotion, Sphenopteris, Schizodus.

5. Define the position of the Karbhari and Talchir groups in the Indian 15 geological systems. Name the principal rocks that make up each system and some fossils of each. Of what economic importance is the Karbhari group?

6. Name the materials erupted from volcanic vents. Discuss the 13 opinions put forth to explain the causes of volcanic phenomena. Draw a section of a volcano. What are fissure eruptions and where in India are they found?

7. Discuss and criticise the various arguments brought forward to 14 determine the *age* of the earth. What is approximately the age which these arguments point to?

8. Describe the different classes of faults, drawing sections in 14 illustration.

Draw sections explaining the following structures:—

Escarpment, anticline, inlier, outlier.

What is inversion? Draw a diagram showing inversion of strata. How may inversion be proved?

ANIMAL PHYSIOLOGY—PAPER I

1. Compare the structure, functions and secretions of the parotid and submaxillary glands. Describe the various ways of demonstrating whether a gland is active or resting. 25

2. Give an account of the vasodilator fibres and describe in detail a few experiments to demonstrate their action. 25

3. Give an account of the way in which the digestive juices of the pancreas and small intestines co-operate in the digestion of food stuffs. Describe fully their action on fats. 25

4. Give an account of the degeneration and regeneration of nerves and describe fully the different physiological methods employed in the study of this subject. 25

ANIMAL PHYSIOLOGY—PAPER II.

1. What is the present state of our knowledge as regards the afferent pathways for sensations of pain and temperature ? Give experimental evidence in support of your statements.

2. Describe the location and connections of the various centres in the brain concerned with speech. What are the common disorders of speech dependent on brain disease and how may they each separately be accounted for ?

3. Give an account of the various recognised cutaneous sensations and indicate what evidence exists as to each sensation being dependent on the estimulation of a distinct type of nerve ending.

4. Draw and describe the minute structure of a mature Graafian follicle. Give an account of the development of the follicle and the subsequent discharge and maturation of the ovum. In what way do these processes throw light on the modern conception of inherited tendencies ?

VII.

EXAMINATION FOR THE DEGREE OF M.A.

EXAMINERS.

A. L. Covernton, M.A. H. G. D. Turnbull, B.A.	In English.
S. R. Bhandarkar, M.A. A. B. Dhruva, M.A., LL.B.	In Sanskrit.
The Rev. A. Allinger, S.J. H. G. Rawlinson, M.A.	In Latin.
P. L. Charlier, B.A. The Rev. V. Hommel, S.J.	In French.
Shams-ul-Ulma Dastur Darab Peshotan Sanjana, B.A. M. B. Davar, M.A., Ph.D., M.R.A.S.	In Avesta and Pahlavi.
Shaikh Abdul Kadir Surfraz, M.A. Mirza Ali Mohommed Khan, M.A., LL.B.	In Persian.
H. N. Apte, Esq. G. K. Devdhar, M.A.	In Marathi.
O. V. Muller, M.A. The Rev. C. Flink, S.J.	In History.
G. C. Bhate, M.A. The Rev. Alex Robertson, M.A.	In Philosophy.
R. P. Paranjpye, B.Sc., M.A. A. C. L. Wilkinson, M.A.	In Mathematics.
The Rev. D. Mackichan, M.A., D.D., LL.D. The Rev. A. Steichen, S.J.	In Physics.
Harold H. Mann, D.Sc., M.Sc. Alex R. Normand, M.A., B.Sc.	In Chemistry.
A. M. Masani, M.A., B.Sc. The Rev. J. Assmuth, S.J.	In Natural Science.
Vasudev Shastri Abhyankar	In the additional pa for the Sujna Gok Zala Vedânt Prize.

MONDAY, 25TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

ENGLISH—PAPER I.

(*Chaucer, Shakespeare, Wordsworth.*)

1. What light does Chaucer's 'Prologue' throw on the state of religion in England in his day?

2. Put the following into modern English prose, adding any explanatory notes on the language or the subject-matter that seem to be called for:—

(*a*) Full weel she soong the service dyvyne,
Entuned in hir nose ful semely,
And Frenssh she spak ful faire and fetisly
After the scole of Stratford-atte-Bowe....

(*b*) Of nyce conscience took he no keepe,
If that he faught, and hadde the hyer hond;
By water he sente hem hoom to every lond.

(*c*) His tithes payde he ful faire and wel,
Both of his propre swynk and his catel.

(*d*) There nas baillif, ne hierde, nor other hyne,
That he ne knew his sleighte and his covyne.

3. What criticisms have been brought against the opening scene of King Lear and how far are they valid?

Or

"If I read King Lear simply as a drama I find that my feelings call for this happy ending" (*Bradley*). Discuss this statement.

4. "As flies to wanton boys are we to the gods;
They kill us for their sport."

"The words just cited strike the keynote of the whole poem." (*Swinburne.*) How far is this statement adequate?

5. Give a clear summary of the events in the last scene of Cymbeline (Act V, Scene V), indicating the successive steps by which Shakespeare brings about the denouement.

6. Sketch and estimate the character of *either* Menenius Agrippa or Tullus Aufidius.

7. Explain the following, with reference to their contexts:—

(*a*) The country gives me proof and precedent
Of Bedlam beggars.

(*b*) And my poor fool is hanged.

(*c*) May these same instruments, which you profane,
Never sound more! when drums and trumpets shall
I' th' field prove flatterers, let courts and cities be
Made all of false-faced soothing!

(*d*) This is a poor epitome of yours,
Which by the interpretation of full time
May show like all yourself.

(*e*) It is a thing I made, which hath the King
Five times redeemed from death.

(*f*) I cannot tremble at it: were it Toad, or Adder, Spider, 8 How far is it possible to extract a consistent philosophy from Wordsworth?

Or

State the chief points in Wordsworth's theory of poetical diction. To what extent can they be held to be sound?

9. Explain the following, with reference to the context:—

(*a*) This beast not unobserved by Nature fell;
His death was mourned by sympathy divine.

(*b*) Many and many a day he thither went,
And never lifted up a single stone.

(*c*) Have I not reason to lament
What man has made of man?

(*d*) Shades of the prison-house begin to close
Upon the growing boy.

Tuesday, 26th November.

[10-30 A.M. TO 1-30 P.M.]

ENGLISH—Paper II.

Milton, Dryden and Carlyle.

N.B.—Two questions only to be attempted in each of Sections I and II, three questions only to be attempted in Section III: all candidates must attempt Section IV; answers to all sections to be given up together.

Section I.

1. Compare the prose styles of Milton and Dryden.

2. On what moral and literary grounds does Milton oppose the Licensing Act? Would his arguments require modification to suit modern life in England?

3. What is Milton's conception of true liberty? Compare it with that of Carlyle.

Section II.

4. State the rules for observing the three Dramatic Unities and discuss the logical or historical grounds on which they were based.

5. What are the arguments used in this dialogue for and against the use of rhyme in drama? What was the practice and theory in this respect of the English dramatists down to the year 1665?

6. Illustrate from this dialogue the virtues and defects of Dryden as a critic and state his importance in the history of English literary criticism.

Section III.

7. Illustrate Carlyle's humour from the two books prescribed.

8. State and account for Carlyle's attitude to the moral and economic doctrine of the Utilitarians.

9. What prompted Carlyle to seek lessons for the "Present" in the social conditions of the Middle Ages? What are the lessons he derives and

0. "At bottom the Great Man, as he comes from the hand of Nature, ver the same kind of thing: Odin, Luther, Johnson, Burns; I hope to ke it appear that these are all originally of one stuff; that only by the ·ld's reception of them, and the shapes they assume, are they so measurably diverse." Explain and criticise this statement.

SECTION IV.

1. Explain :—

(a) Out of those ages to whose polite wisdom and letters we owe that we are not yet Goths and Jutlanders, I could name him who from his private house wrote that discourse to the Parliament of Athens that persuades them to change the form of democracy which was then established.

(b) The French often use narrations with better judgment and more *á propos* than the English do.

(c) The description of these humours, drawn from the knowledge and observation of particular persons, was the peculiar genius and talent of Ben Jonson.

(d) While man is man, some Cromwell or Napoleon is the necessary finish of a Sansculottism. The manner in which Kings were made, and Kingship itself took rise, is again exhibited in the history of these Two.

(e) The 'tree Igdrasil' buds and withers by its own laws,—too deep for our scanning. Yet it does bud and wither, and every bough and leaf of it is there, by fixed eternal laws.

(f) The SILENCE of deep Eternities, of Worlds from beyond the morning-stars, does it not speak to thee? The unborn Ages; the old Graves, with their long-mouldering dust, the very tears that wetted it now all dry,— do not these speak to thee, what ear hath not heard?

WEDNESDAY, 27TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

ENGLISH (*Composition*).

Delight is the chief, if not the only, end of poésie; instruction can be admitted but in the second place; for poésie only instructs as it delights.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANSKRIT—PAPER I.

N.B.—The answers to the two sections to be written in separate books.

SECTION I.

1. Translate into English :—

(a) यं क्रन्दसी संयती विह्वयेते परेवर उभया अमित्राः ।
समानं चिद्रथमातस्थिवांसा नाना हवेते स जनास इन्द्रः ॥

(b) नूनं सा ते प्रति वरं जरित्रे दुहीयदिन्द्र दक्षिणा मघोनी ।
शिक्षा स्तोतृभ्यो माति धग्भगो नो बृहद्वदेम विदथे सुवीराः ॥ II. 15·1

(c) अस्मै बहूनामवमाय सख्ये यज्ञैर्विधेम नमसा हविर्भिः ।
सं सानु मार्ज्मि दिधिषामि बिल्मैर्दधाम्यन्नैः परि वन्द ऋग्भिः । II. 35·1

(d) दैव्या होतारा प्रथमा न्यृञ्जे सप्त पृक्षासः स्वधया मदन्ति ।
ऋतं शंसन्त ऋतमित्त आहुरनु व्रतं व्रतपा दीध्यानाः ॥ III. 4

(e) इन्द्रोतिभिर्बहुलाभिर्नो अद्य याच्छ्रेष्ठाभिर्मघवञ्छूर जिन्व ।
यो नो द्वेष्ट्यधरः सस्पदीष्ट यमु द्विष्मस्तमु प्राणो जहातु ॥ III. 53·2

(f) पदे इव निहिते दस्मे अन्तस्तयोरन्यद्गुह्यमाविरन्यत् ।
सध्रीचीना पथ्या३ सा विषूची महद्देवानामसुरत्वमेकम् ॥ III. 55·

2. (a) Write notes on the meanings of the words क्रन्दसी and दस्मे in question 1.

(b) What various meanings and etymologies of विदथ are offered by scholars and how are they justified?

(c) From the following passages show how you would determine the meanings of पृक्ष and find out to whom the expression सप्त पृक्षासः in (d) above refers:—

(1) तमीशानास इरधन्त वाजिनं पृक्षमत्यं न वाजिनम् । I. 129-2

(2) हिरण्यशिप्रा मरुतो दविध्वतः पृक्षं याथ पृषतीभिः समन्यवः
II.

(3) ऋतं शंसन्त ऋजु दीध्याना दिवस्पुत्रासो असुरस्य वीराः ।
विप्रं पदमङ्गिरसो दधाना यज्ञस्य धाम प्रथमं मनन्त ॥ X.

(4) उपेममिन्दुं मर्मृजन्त वाजिनमाशुमत्यं न वाजिनम् । I. 135-5

(5) तु॒र॒ण्यवोङ्गि॑रसो नक्षन्त॒ रत्नं॑ दे॒वस्य॑ सवि॒तुरि॑या॒नाः । VII. 52·3

(6) पृ॒क्षो यदत्र॑ महि॒ना वि ते भुव॒द॒नु द्यावा॑पृथि॒वी रोद॑सी उ॒भे
II. 1·1

(7) यो ना॑र्म॒रं स॒हव॒सुं॑ निह॑न्तवे पृ॒क्षाय॑ च दा॒सवे॑शाय॒ चाव॑हः ।
II. 13·

Translate 2 and 6.

(*d*) What legends are cited by Sâyaṇa with reference to verse (*e*) in question 1 and the three following verses in the same hymn?

(*e*) What case is दृह्मे ? Sâyaṇa takes it as dual. Padapâṭha: दृ॒ह्मे । अ॒न्तरिति॑ । who are meant by तयोः ?

3. (*a*) What tenses have in the Veda a subjunctive inflection? Give the terminations and state how the mode stem is made. Give an instance of a subjunctive form for each of the tenses.

(*b*) Point out any anomaly as regards accent in the following:—

इन्द्र॒ सोमं॑ सोमप॒ते पि॒बेमम् ।

How might you account for it?

4. What are the senses of the word असुर and its derivatives in the Ṛigveda? Give instances. What are the Avestan words corresponding to *Asura* and *Deva* and what are their meanings? What is the meaning of the words related to *Deva* in the other Indo-European languages? What explanations are given of the fact of the different senses of असुर in the Ṛigveda? State which of them would fit in with the other facts referred to in this question.

5. Give an account of the character and functions of Tvashṭri as gathered from Maṇḍalas II and III and his relations with Indra. Of what natural phenomenon may he be taken as a personification?

6. Mention the principles of arrangement of the Sûktas in Maṇḍalas II and III. Mention any deviations from those principles. How would you account for such deviations?

SECTION II.

7. "Adam Smith would wish us to believe that the first artificial words were *verbs*. Nouns, he thinks, were of less urgent necessity because things could be pointed at or imitated, whereas mere actions, such as are expressed by verbs, could not...... Dugald Stewart, on the contrary, thinks that the first artificial words were *nouns*, and that the verbs were supplied by gesture".

Max Muller.

What have Yâska and his predecessors in the Science of Language to say on this point?

8. How are the following Vedic texts interpreted in the Nirukta :—

(*a*) य ईं चकार न सो अस्य वेद य ईं ददर्श हिरुगिन्नु तस्मात् ।
स मातुर्योना परिवीतो अन्तर्बहुप्रजा निर्ऋतिमा विवेश ॥

(*b*) सप्त मर्यादाः कवयस्ततक्षुस्तासामेकामिदभ्यंहुरो गात् ॥

(*c*) सप्त युञ्जन्ति रथमेकचक्रमेको अश्वो वहति सप्तनामा ।
त्रिनाभि चक्रमजरमनर्वं यत्रेमा विश्वा भुवनाधि तस्थुः ॥

9. (*a*) Reproduce (in English) the discussion contained in the Nirukta about the *daughter's* right of inheritance.

(*b*) State whether, in your opinion, Prof. Roth's misgivings regarding the genuineness of the verses introduced with the words "तदेतदृक्श्लोकाभ्यामभ्युक्तम्" and the whole legal discussion contained in Nirukta III, i, 4—6 are well founded. Give reasons for your answer.

10. How do you determine the *devatá* of a *mantra*? What differences of opinion prevailed in and before the time of Yâska regarding the *devatá* of a *non-sacrificial mantra*?

11. Explain—

(*a*) वायो वेः पुत्रः ... वेति च य इति च चकार शाकल्य उदात्त त्वेवमाख्यातमभविष्यदसुसमाप्तश्चार्थः ।

(*b*) अथादित्यादुदीचि प्रथमसमावृत्त आदित्ये कंसं वा मणिं व परिमृज्य प्रतिस्वरे यत्र शुष्कगोमयमसंस्पर्शयन् धारयति तत्प्रदीप्यते सोऽयमेव ।

(*c*) बहुभक्तिवादीनि हि ब्राह्मणानि भवन्ति ।

(*d*) साम सम्मितमृचा स्यतेर्वर्चा समं मेन इति नैदानाः ।

(*e*) यत्र स्वरादनन्तरान्तस्थान्तर्धातु भवति तद्द्विप्रकृतीनां स्थानम् ।

(*f*) भाषिकेभ्यो नैगमाः कृता भाष्यन्ते......अथापि नैगमे
भाषिकाः ।

Annotate the words underlined.

12. How are the following words derived in the Nirukta :—

स्याल, नासत्यौ, प्रमगन्द, अनुष्टुभ्, कम्बोज, पराशर and दमूनाः ।

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

SANSKRIT—PAPER II.

Alankâras'astra.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Explain the propriety of the expressions underlined in the following definitions:—

(*a*) प्रकृतधर्मिणि प्रकृतव्यवहारानुल्लेखेन निरूप्यमाणोप्रकृतव्यवहा संबन्धो ललितालंकारः ।

(*b*) अनुमितिकरणत्वेन सामान्यविशेषभावाभ्यां चानालिङ्गि प्रकृतार्थोपपादकत्वेन विवक्षितोर्थः काव्यलिङ्गम् ।

(*c*) एकस्य वस्तुनो निमित्तवशाद्यदनेकैर्ग्रहीतृभिरनेकप्रकारकं ग्रह तदुल्लेखः ।

2. What is the *Alaṃkâra* in the following:—

भद्रात्मनो दुरधिरोहतनोर्विशाल-
वंशोन्नतेः कृतशिलीमुखसंग्रहस्य ।
यस्यानुपप्लुतगतेः परवारणस्य
दानाम्बुसेकसुभगः सततं करोभूत् ॥

Wherein does it consist? Can it properly be called an alaṃkâra in the present case? If not, state why. Under what circumstance would the passage have been an instance of अप्रस्तुतप्रशंसा and श्लेष?

3. State and explain the distinction between नियम and परिसंख्या; and examine if the *alaṃkâra* called परिसंख्या can strictly be so called.

4. (*a*) Explain what Dandin calls समाधि. Show what it would be called by later Âlaṃkârikas.

(b) Cite Daṇḍin's instances of अतिशयोक्ति. Of what alaṃkâras would they be regarded as instances by later writers and why?

5. (a) Discuss the question whether the Kârikâs and the Vṛitti in Dhvanyâloka are of the same or different authorship.

(b) Mention the views of other writers cited by Daṇḍin and state Daṇḍin's own views on the points in question.

SECTION II.

6. (a) What is the distinction, if any, between the *Dhvani*-theory and the *Rasa*-theory of Poetry?

(b) Explain the following kârikâ, and show how the *Rîti*-theory may be regarded as an imperfect realization of the full truth which is unfolded in the *Dhvani*-theory according to ध्वनिकार:—

"अस्फुटस्फुटितं काव्यतत्त्वमेतद्यथोदितम् ।
अशक्नुवद्भिर्व्याकर्तुं रीतयः संप्रवर्तिताः ॥"

(c) Name the different kinds of रीतिs known to Âlaṃkârikas, and explain their relation to वृत्तिs.

7. "विभावानुभावव्यभिचारिसंयोगाद्रसनिष्पत्तिः"—

Explain this text; and distinguish carefully between the several theories of the nature of æsthetic pleasure ('रसनिष्पत्ति') to which it has given rise, naming the authors to whom the theories are generally attributed, and pointing out their connection, if any, with the standpoints of मीमांसा, न्याय, साङ्ख्य and अलङ्कार from which their differences are supposed to have originated. Which of them is the most approved theory according to Mammaṭa, and why?

8. (a) In what light would Ânandavardhana look upon the fun and frolic of the fool in the play of King Lear?

(b) Write a note on the use and abuse of अलङ्कारs in poetry, and particularly of यमक and अनुप्रास.

9. *Determine दोषs and अलङ्कारs, if any, in the following:—

(a) पातु वो गिरिजामाता द्वादशार्धार्धलोचनः ।
यस्य सा गिरिजा माता स एव द्वादशलोचनः ॥

(*b*) गतेऽर्धरात्रे परिमन्दमन्दं गर्जन्ति यत् प्रावृषि कालमेघाः ।
अपश्यती वत्समिवेन्दुबिम्बं तच्छर्वरी गौरिव हुंकरोति ॥

(*c*) यां चिन्तयामि सततं मयि सा विरक्ता
साप्यन्यमिच्छति जनं स जनोऽन्यसक्तः ।

अस्मत्कृते च परिखिद्यति काचिदन्या
धिक् तां च तं च मदनं च इमां च मां च ॥

(*d*) सत्यं मनोरमा रामाः सत्यं रम्या विभूतयः ।
किन्तु मत्ताङ्गनापाङ्गभङ्गलोलं हि जीवितम् ॥

10. (*a*) हेतूत्प्रेक्षायां पञ्चम्यर्थो हेतुरभेदश्च प्रकृतिप्रत्ययार्थयोः संसर्ग इति पक्षे विश्लेषदुःखाभिन्नहेतुः पञ्चम्यन्तार्थः । तस्य च प्रयोज्यतासंसर्गेणोत्प्रेक्षणमिवादिना बोध्यते । प्रयोज्यत्वं पञ्चम्यर्थ इति दर्शने निरूपितत्वं प्रकृतिप्रत्ययार्थयोः संसर्गः । आश्रयतासंसर्गेण चोत्प्रेक्षणम् । उभयथापि पञ्चम्यर्थ एवोत्प्रेक्ष्यः । तेनैवेवाद्यर्थान्वयात् । उत्प्रेक्ष्यतावच्छेदकसंबन्धेनोत्प्रेक्ष्यसमानाधिकरणश्च धर्मोतिशयोक्त्या मौनाभिन्नत्वेनाध्यवसितनिश्चलत्वादिर्निमित्तम् । बद्धमौनं च विषयः । मौनद्वारकं च बद्धमौनस्य प्रयोज्यत्वं संभाव्यते । एवं प्रयोज्यधर्मके धर्मिणि सर्वत्रापि धर्मद्वारक एव पञ्चम्यर्थान्वयः । यत्र तु धर्म एव किंचिद्धर्माभिन्नत्वेनाध्यवसितः साक्षाद्विषयस्तत्र विषयतावच्छेदकधर्मो निमित्तम् । यथा तत्रैव विश्लेषदुःखादिव बद्धमौनमस्योति निर्माणे मौनत्वम् ।

(*b*) वाचकानामर्थापेक्षा व्यञ्जकानां तु न तदपेक्षत्वमिति न वाचकत्वमेव व्यञ्जकत्वम् । किं च वाणीरकुडङ्गेत्यादौ प्रतीयमानमर्थमभिव्यज्य वाच्यं स्वरूप एव विश्राम्यति तत्र गुणीभूतव्यङ्ग्येऽतात्पर्यभूतेऽप्यर्थः स्वशब्दानाभिधेयः प्रतीतिपथमवतरन् कस्य व्यापारस्य विषयतामवलम्बताम् ? ।

(*c*) रसादिलक्षणस्त्वर्थः स्वप्नेऽपि न वाच्यः ... न पुनर्लक्षणीयः ।

(*d*) यत्र शब्दानामर्थानां च केषांचित् प्रतिपत्तृविशेषसंवेद्यं जात्यत्वमिव रत्नविशेषाणां चारुत्वमनाख्येयमवभासते काव्ये तत्र ध्वनिव्यवहार इति यल्लक्षणं ध्वनेरुच्यते केनचित्तदयुक्तम् ।

(e) गुणवृत्त्या काव्येषु व्यवहारं दर्शयता ध्वनिमार्गो मनाक्स्पृष्टो लक्ष्यत इति परिकल्प्यैवमुक्तम् 'भाक्तमाहुस्तमन्ये'।

Explain (a) and (b). Establish (c) and (d). Name the writers whose view is supposed to have been alluded to in (e); differentiate it from that of the Siddhântin, and state what reasons the latter advances in support of his position.

11. (a) What is meant by 'संघटना'? What relation does it bear to गुणs? In what relation do the latter stand to शब्द, अर्थ and रस? Name the three guṇas recognized by Mammata, and give reasons in detail for his rejection of the larger number recognized by Vâmana.

(b) Explain the point of the following objection, and state how it is answered in the Dhvanyâloka:—

"यदि गुणाः संघटना चेत्येकं तत्त्वं संघटनाश्रया वा गुणाः तदा संघटनाया इव गुणानामनियतविषयत्वप्रसङ्गः."

Vedânta.

SECTION I.

1. Explain clearly:—

(a) सत्यं ज्ञानमनन्तं ब्रह्मेत्यत्रापि सामानाधिकरण्यस्यानेकविशेषणविशिष्टैकार्थाभिधानव्युत्पत्त्या न निर्विशेषवस्तुसिद्धिः । प्रवृत्तिनिमित्तभेदेनैकार्थवृत्तित्वं सामानाधिकरण्यम् । तत्र सत्यज्ञानादिपदमुख्यार्थैर्गुणैस्तत्तद्गुणविरोध्याकारप्रत्यनीकाकारैर्वा एकस्मिन्नेवार्थे पदानां प्रवृत्तौ निमित्तभेदोवश्याश्रयणीयः । इयांस्तु विशेषः । एकस्मिन् पक्षे पदानां मुख्यार्थता परस्मिंश्च तेषां लक्षणा । न चाज्ञानादीनां प्रत्यनीकता वस्तुस्वरूपमेव । एकेनैव पदेन स्वरूपं प्रतिपन्नमिति पदान्तरप्रयोगवैयर्थ्यात् । तथा सति सामानाधिकरण्यासिद्धिश्च । एकस्मिन्वस्तुनि वर्तमानानां पदानां निमित्तभेदानाश्रयणात् । न चैकस्यैवार्थस्य विशेषणभेदेन विशिष्टताभेदादनेकार्थत्वं पदानां सामानाधिकरण्यविरोधि । एकस्यैव वस्तुनोनेकविशेषणविशिष्टताप्रतिपादनपरत्वात्सामानाधिकरण्यस्य । भिन्नप्रवृत्तिनिमित्तानां शब्दानामेकस्मिन्नर्थे वृत्तिः सामानाधिकरण्यमिति शाब्दिकाः ।

(*b*) यस्तु ज्ञानप्रागभावविषयत्वे विरोध उक्तः स हि भावरूपाज्ञानेपि तुल्यः । विषयत्वेनाश्रयत्वेन चाज्ञानस्य व्यावर्तकतया प्रत्यगर्थः प्रतिपन्नोप्रतिपन्नो वा । प्रतिपन्नश्चेत् तत्स्वरूपज्ञाननिवर्त्यतदज्ञानं तस्मिन् प्रतिपन्ने कथमिव तिष्ठति । अप्रतिपन्नश्चेत् व्यावर्तकाश्रयविषयज्ञानशून्यमज्ञानं कथमनुभूयेत । अथ विशदस्वरूपावभासो ज्ञानविरोधी अविशदस्वरूपं तु प्रतीयत इत्याश्रयविषयज्ञाने सत्यपि नाज्ञानुभवविरोध इति । हन्त तर्हि ज्ञानप्रागभावोपि विशदस्वरूपविषय आश्रयप्रतियोगिज्ञानं त्वविशदस्वरूपविषयमिति न कश्चिद्विशेषोन्यत्राभिनिवेशात् । भावरूपस्याज्ञानस्यापि ह्यज्ञानमिति सिध्यतः प्रागभावसिद्धाविव सापेक्षत्वमस्त्येव । तथाहि । अज्ञानमिति ज्ञानाभावः तदन्यः तद्विरोधि वा । त्रयाणामपि तत्स्वरूपज्ञानापेक्षावश्याश्रयणीया । यद्यपि तमःस्वरूपप्रतिपत्तौ प्रकाशापेक्षा न विद्यते तथापि प्रकाशविरोधीत्यनेनाकारेण प्रतिपत्तौ प्रकाशप्रतिपत्त्यपेक्षास्त्येव । भवदभिमताज्ञानं न कदाचित्स्वरूपेण सिध्यति अपि त्वज्ञानमित्येव । तथा सति ज्ञानाभाववत् तदपेक्षत्वं समानम् । ज्ञानप्रागभावस्तु भवताप्यभ्युपगम्यते प्रतीयते चेत्युभयाभ्युपेत्ये ज्ञानप्रागभाव एव अहमज्ञो मामन्यं च न जानामीत्यनुभूयत इत्यभ्युपगन्तव्यम् ।

2. How does Râmânuja interpret the Sûtras अनुकृतेस्तस्य च । and अपि स्मर्यते ? What previous interpretation does he notice and how does he criticise it. State, with reasons, which interpretation you think is likely to be more correct.

3. S'aṃkarâchârya introduces the *adhikaraṇa* beginning with जगद्वाचित्वात् with the words :—

कौषीतकिब्राह्मणे बालाक्यजातशत्रुसंवादे श्रूयते यो वै बालाक एतेषां पुरुषाणां कर्ता यस्य वै एतत्कर्म स वै वेदितव्यः इति तत्र किं जीवो वेदितव्यत्वेनोपदिश्यत उत मुख्यः प्राण उत परमात्मेति विशयः । किं तावत्प्राप्तम् । प्राण इति.

Compare with this Râmânuja's view as to the purpose of the *adhikaraṇa* and state, with reasons, which view is likely to be more correct.

4. State and explain the different parts of which an *adhikaraṇa* consists and point them out in the case of the *Áttradhikaraṇa.*

5. What explanations does Râmânuja give of—

स्वप्नसृष्टि, द्विचन्द्रज्ञान, शुक्तिकायां रूप्यविज्ञान in justifying the statement यथार्थं सर्वविज्ञानम्?

SECTION II.

6. Explain clearly:—

(*a*) ज्ञानानन्दादिशक्तियोग एवास्य स्वाभाविक इति मा वोचः। शक्तिः स्वाभाविकी ज्ञानबलक्रिया च स्वाभाविकी इति पृथङ्निर्देशाल्लक्षणाप्रसङ्गाच्च। न च पाचकादिवत् सर्वज्ञ इत्यादिषु शक्तिमात्रे कृत्प्रत्यय इति वक्तुं शक्यम्। कृत्प्रत्ययस्य शक्तावस्मरणात्, "शक्तौ हस्तिकवाटयोः" इत्यादिषु केषाञ्चिदेव कृत्प्रत्ययानां शक्तिविषयत्वस्मरणात्। पाचकादिषु त्वगत्या लक्षणा समाश्रीयते।

(*b*) कालोऽस्ति नास्तीति व्यवहारो व्यवहर्तॄणां जात्याद्यस्तित्वनास्तित्वव्यवहारतुल्यः।

(*c*) श्रुतिलिङ्गवाक्यप्रकरणस्थानसमाख्यानां समवाये परदौर्बल्यमर्थविप्रकर्षात्।

(*d*) समस्तवस्तुप्रकारिणो ब्रह्मणः प्रकारभूतवस्तुग्राहिप्रत्यक्षादिप्रमाणाविषयत्वाद्वेदान्तश्रवणात् प्राक् प्रकार्यप्रतीतेः प्रकारिप्रतीतिभावभावित्वाच्च तत्पर्यवसानस्य लोके तत्तद्वस्तुमात्रे वाच्यैकदेशे ते ते शब्दा भङ्क्त्वा भङ्क्त्वा व्यपदिश्यन्ते।

(*e*) पूर्वपूर्वाध्यासमूल एवायमुत्तरोत्तरोऽहङ्काराध्यासः बीजाङ्कुरवदनादिः। अविद्याध्यासश्च एक एवानादिः।

(*f*) यस्मिन् पक्षेऽन्तःकरणावच्छिन्नो जीवः यस्मिंश्च पक्षे सर्वगतोऽसङ्गोऽविद्याप्रतिबिम्बो जीवः तत्रोभयत्रापि प्रमातृचैतन्योपरागार्था विषयगतचैतन्यावरणभङ्गार्था चान्तःकरणवृत्तिः। यस्मिंश्च पक्षेऽविद्यावच्छिन्नः सर्वगतो जीव आवृतः तस्मिन् पक्षे...आवरणभङ्गार्था वृत्तिरिति विवेकः।

How is the view of अध्यास contained in (*e*) reconciled by Madhus

Sarasvatî with S'ankarâs definition of it given in the शारीरकभाष्य ?

Who are the principal supporters of the two पक्षs referred to in (*f*) ?

7. Explain the nature of the ‘पक्ष’ referred to in the following quotati

“साभासज्ञानवाची यदि भवति पुनर्ब्रह्मशब्दस्तदाहं-
शब्दोऽहङ्कारवाची भवति तु जहती लक्षणा तत्र पक्षे ।

What is the other ‘पक्ष’ from which it is meant to be distinguished?

Name the author of the work from which the quotation is made.

8. Explain the following propositions giving the context when necessary state how Râmânujâchârya supports them in his Bhâshya :—

(*a*) यत्तु परैर्ब्रह्मकारणवादे भोक्तृभोग्यविभागाभावमाशङ्क्य समु नतरङ्गदृष्टान्तेन विभागप्रतिपादनपरं सूत्रं व्याख्यातं तदयुक्तम् ।

(*b*) आर्तभागप्रश्नोऽपि यदा विद्वद्विषयः तदाऽयमेव परि सत्वविद्वद्विषयः ।

(*c*) परैः सूत्रचतुष्टयं कस्यचित् विरुद्धांशस्य प्रामाण्यनिषेधपरं ख्यातं तत्सूत्राक्षराननुगुणं सूत्रकाराभिप्रायविरुद्धं च ।

In the case of the words underlined in (*c*) discuss the assumption underlies Râmânuja's argument.

9. Interpret the following sûtras :—

(*a*) हानौ तूपायनशब्दशेषत्वात् कुशाच्छन्दःस्तुत्युपगानवत्तदु

(*b*) कृतात्ययेऽनुशयवान् दृष्टस्मृतिभ्यां यथेतमनेवं च ।

(*c*) मायामात्रं तु कार्त्स्न्येनाभिव्यक्तस्वरूपत्वात् ।

(*d*) पराभिध्यानात्तु तिरोहितं ततो ह्यस्य बन्धविपर्ययौ ।

Compare and discuss the interpretations put upon (*c*) and (*d*) by S'ankar Râmânuja, citing passages bearing on the meanings of the words ‘कार्त्स्न्ये’ and ‘पराभिध्यान.’

10. What differences exist between Sankara and Râmânuja as regards (i) the nature of जीवात्मा, (ii) the utility of works (कर्म) for producing मुक्ति, and (iii) the meaning of the text "न तस्य प्राणा उत्क्रामन्ति." Compare the treatments given by the two Âchâryas to the sûtras bearing on these points.

11. Compare the views of Kapila, Râmânuja and Śankara on the relation of cause and effect in general, and that of the World (जगत्) and its Cause in particular. In the latter case, note all the theories which have sprung into existence in the Śânkara school after the death of S'ankarâchârya in chronological order, and point out their logical connections.

12. Explain the following distinctions :—

"मुमुक्षवो द्विविधाः कैवल्यपरा मोक्षपराश्च ;......मोक्षपराश्च द्विविधाः भक्ताः प्रपन्नाश्च......; भक्ता द्विविधाः साधनभक्तिनिष्ठाः साध्यभक्तिनिष्ठाश्च......; प्रपन्नो द्विविधः त्रैवर्गिकपरो मोक्षपरश्च......; एकान्ती परमैकान्ती च "

13. (*a*) State what you know of—

बकुलाभरण, नाथमुनि and यामुनमुनि.

(*b*) Name the principal works of—

यामुनमुनि and रामानुजाचार्य.

THURSDAY, 28TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.].

SANSKRIT—PAPER III.

(*Translation.*)

N.B.—The answers to the two sections to be written in separate books.

SECTION I.

1. Translate into English :—

(*a*) योऽपि हि विषयसंवेदनानुमेयं ज्ञानमिच्छति सोऽप्येवं पर्यनुयोज्यः । किं विषयसंवेदनमात्मनि समवैति विषये वा । न तावद्विषये तच्चैतन्यप्रतिषेधात् । अथात्मनि समवैति ततः किमन्यद्विज्ञानं यदस्यानु

नेयम् । अस्य कारणं ज्ञातृव्यापारलक्षणं तदिति चेत् तत् किं नित्यमनित्यं वा । यद्यनित्यं तदुत्पत्तावपि कारणं वाच्यम् । विषयेन्द्रियादिसहकारी ज्ञातृमनःसंयोगोऽस्य कारणमिति चेत् सैव सामग्री विषयसंवेदनोत्पत्तावस्तु किमन्तर्गडुनानेन । अथ तन्नित्यं कादाचित्कविषयेन्द्रियासंनिकर्षादिसहकारि कादाचित्कं विषयसंवेदनं करोतीत्यभ्युपगमः । तदस्याप्यागन्तुककारणकलापादेव विषयसंवेदनोत्पत्तिसिद्धौ तत्कल्पनावैयर्थ्यम् । विषयसंवेदनादेवार्थावबोधस्य तत्पूर्वकस्य व्यवहारस्य च सिद्धेः । अथोच्यते विषयेन्द्रियादिजन्यं विज्ञानं कथमात्मन्येव समवैति यद्यात्मा सहजज्ञानमयो न स्यात् तस्याचेतनत्वे हि कारणत्वाविशेषादिन्द्रियादिष्वपि ज्ञानसमवायो भवेदिति । तन्न । स्वभावनियमादेव नियमोपपत्तेः । यथा तन्तूनामपटत्वेऽपि तन्तुत्वजातिनियमात् तेषु पटसमवायो न तुर्यादिषु तद्वदचिदात्मकेऽप्यात्मनि आत्मत्वजातिनियमाज्ज्ञानसमवायस्य नियमो भविष्यति ।

(*b*) उद्धवः (साङ्गुलिनिर्देशम्) भद्रे

आसारानिलकम्पितव्रजजनत्राणाय गोवर्धने
देवेनात्र सरोजनालरुचिना दोष्णातपत्रीकृते ।
आपातालगभीरमूलविवरोत्तिष्ठत्फणिग्रामणी-
मूर्धन्याहरणरत्नमण्डलमहस्काण्डेन दण्डायितम् ॥

वाडुभद्रः — (रुक्मिणीं प्रति)

देवस्य श्वशुरो हरेर्भगवतः सेता सुधादीधितेः
कीर्तिद्रुमभूरहर्मणिकुलक्षोणीभुजां सागरः ।
यत्र द्वारवती विचित्रविभवा वैडूर्यवर्णाम्भसि
स्वर्गस्य प्रतियातनेव हरिणीशावाक्षि संलक्ष्यते ॥

(*c*) रत्नावतंस इव भारतमण्डलस्य
क्रामन् दिशो दशरथः स्फुटवीरलक्ष्मीः ।
राजा सुमन्त्रविहिताभिरतिर्बभूव
पाण्डुर्यशोभिरभिरञ्जितसर्वलोकः ॥

(राघवपाण्डवीयम्)

(*d*) स्वर्लोकेषु च विद्विषां क्षितिषु च व्यालेन्द्रगेहेषु च
स्वाराजं च रिपुव्रजं च मुरजिन्नागाधिराजं च यः ।
ऐश्वर्येण च विक्रमेण धराभारक्षमत्वेन च
न्यक्कुर्वंश्च पराभवंश्च समतिक्रामंश्च पृथ्वीमपात् ॥
अत्याश्चर्यमदृष्टमश्रुतमिदं कस्मै समाचक्ष्महे
को न्वेतत् प्रतिपद्यते च तदपि प्रस्तूयते कौतुकात् ।
उद्धृत्यापि वसुन्धरामसदृशीं लब्ध्वापि लक्ष्मीं च यः
कुर्वन् कार्यमनेकशः सुमनसामागान्न वैकुण्ठताम् ॥

SECTION II.

2. Translate into Sanskrit:—

(*a*) Our pious Fathers, feeling well what importance lay in the speaking of man to men, founded churches, made endowments, regulations; everywhere in the civilised world there is a Pulpit, environed with all manner of complex dignified appurtenances and furtherances, that therefrom a man with the tongue may, to best advantage, address his fellow-men. They felt that this was the most important thing; that without this there was no good thing. It is a right pious work, that of theirs, beautiful to behold! But now with the art of Writing, with the art of Printing, a total change has come over that business. The writer of a Book, is not he a Preacher preaching not to this parish or that, on this day or that, but to all men in all times and places? Surely it is of the last importance that *he* do his work right, whoever do it wrong;—that the *eye* report not falsely, for then all the other members are astray! Well, how he may do his work, whether he do it right or wrong, or do it at all, is a point, which no man in the world has taken the pains to think of. To a certain shopkeeper, trying to get some money for his books, if lucky, he is of some importance; to no other man of any. Whence he came, whither he is bound, by what ways he arrived, by what he might be furthered on his course, no one asks. He is an accident in society.

(*b*) Yet bitter, oft-times bitter, was the pang
When of thy loss I thought, beloved wife!
On thee too fondly did my memory hang,
And on the joys we shared in mortal life,—
The paths which we have trod—these fountains, flowers;
My new-planned cities, and unfinished towers.

But should suspense permit the foe to cry,
"Behold they tremble!—haughty their array
Yet of their number no one dares to die"?
In soul I swept the indignity away:
Old frailties then returned:—but lofty thought,
In act embodied, my deliverance wrought.

And thou, though strong in love, art all too weak;
In reason, in self-government too slow;
I counsel thee by fortitude to seek
Our blest re-union in the shades below.
The invisible world with thee hath sympathised;
Be thy affections raised and solemnised.

MONDAY, 25TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

LATIN—PAPER I.

Plautus, Miles Gloriosus. Cicero, Tusculanae Disput. I, II, V.

1. Translate :—

(1) *Pa.* Quod id est facinus? *Sc.* Inpudicum. *Pa.* Tute scias soli tibi:
Mihine dixis; scire nolo. *Sc.* Non enim faciam quin scias.
Simiam hodie sum sectatus nostram in horum tegulis.
Pa. Edepol, Sceledre, homo sectatu's nihili nequam bestiam,
Sc. Di te perdant. *Pa.* Te istuc aequomst—quoniam occepisti, eloqui.
Sc. Forte fortuna per impluvium huc despexi in proxumum:
Atque ego illi aspicio osculantem Philocomasium cum altero
Nescio quo adulescente. *Pa.* Quod ego, Sceledre, scelus ex te audio?

(2) *Sc.* Nunc demum a me insipienter factum esse arbitror,
Quom rem cognosco: at non malitiose tamen
Feci. *Pe.* Immo indigne: nam hominem servum suos
Domitos habere oportet oculos et manus
Orationemque. *Sc.* Egone si post hunc diem
Muttivero, etiam quod egomet certo sciam,
Dato excruciandum me: egomet me dedam tibi.
Nunc hoc mi ignosce quaeso. *Pe.* Vincam animum meum.

(3) *Mi.* Cedo te mihi solae solum.
Pa. Brevin an longinquo sermoni? *Mi.* Tribus verbis. *Pa.* Iam ad te redeo.
Py. Quid ego? hic astabo tantisper cum hac forma ac factis frustra?
Pa. Patere atque asta: tibi ego hanc do operam. *Py.* Propera: exspectando excrucior.
Pa. Pedetemptim tu hac scis tractari solitas esse huius modi mercis.
Py. Age ago, ut tibi maxime concinnumst. *Pa.* Nullumst hoc stolidius saxum.
Adeo ad te. quid me voluisti? *Mi.* Quo pacto hoc occipiam, aperi.
Pa. Vetus adfero ego ad te consilium, quasi hunc depereat... *Mi.* Teneo istuc.

(4) Scan the first three lines of 1 and of 2.

2. Explain, with reference to the context, the following passages :—

(1) *Sc.* Nunc demum experior mi ob oculos caliginem obstitisse. *Pa.* Dudu edepol planum est hoc quidem: quae hic usque fuerit intus. *Sc.* Nihil habe certi quid loquar: non vidi eam etsi vidi. *Pa.* Ne tu stultitia tua nos paen perdidisti: dum te fidelem facere ero voluisti, absumptu's paene.

(2) *Pa.* Miles domum ubi advenerit, memineris ne Philocomasium nomine *Pl.* Quem nominem? *Pa.* Glyceram. *Pl.* Meminero: sed quid meminisse refert, rogo ego te tamen. *Pa.* Ego enim dicam tum, quando usus posce interea tace: ut tum, quom etiam hic aget, actutum partis defendas tuas.

(3) *Ac.* Iste metus me macerat, quod illic fastidiosust, oculi eius ne sententia mutent, ubi viderit me, atque eius elegantia meam extemplo speciem spern *Mi.* Non faciet. *Ac.* Metuo, ne praedicatio tua nunc meam formam exsuper *Mi.* Istuc curavi, ut opinione illius pulcrior sis.

3. What is your view about the dramatic unity of the *Miles Gloriosus*?

4. Estimate the debt of the Roman drama to Greek influence.

5. Translate :—

(1) Ut deos esse natura opinamur qualesque sint ratione cognoscimus, sic permanere animos arbitramur consensu nationum omnium, qua in sede maneant qualesque sint ratione discendum est. Cuius ignoratio finxit inferos easque formidines, quas tu contemnere non sine causa videbare. In terram enim cadentibus corporibus usque humo tectissub terra censebant reliquam vitam ag mortuorum. Quam eorum opinionem magni errores consecuti sunt, quos auxerunt poetae ; tantumque valuit error, ut, corpora cremata cum scirent, tamen ea fieri apud inferos fingerent, quae sine corporibus nec fieri possent ne intellegi.

(2) Est animus in partes tributus duas, quarum altera rationis est particeps altera expers. Cum igitur praecipitur, ut nobismet ipsis imperemus, ho praecipitur, ut ratio coërceat temeritatem. Est in animis omnium fere natur molle quiddam, demissum, humile, enervatum quodam modo et languidu Si nihil esset aliud, nihil esset homine deformius. Sed praesto est domin omnium et regina, ratio, quae conixa per se et progressa longius fit perfect virtus. Haec ut imperet illi parti animi, quae oboedire debet, id videndum e viro.

(3) Cum perturbationes animi miseriam, sedationes autem vitam efficia beatam duplexque ratio perturbationis sit, quod aegritudo et metus in mal opinatis, in bonorum autem errore laetitia gestiens libidoque versetur, qu omnia cum consilio et ratione pugnent, his tu tam gravibus concitationib tamque ipsis inter se dissentientibus quem vacuum, solutum, liberum videri hunc dubitabis beatum dicere ? Atqui sapiens semper ita adfectus est : semp igitur sapiens beatus est.

6. Explain Cicero's reasoning in the following passages, and criticize it :—

(1) Is animus, qui, si est horum quattuor generum ex quibus omnia consta dicuntur, ex inflammata anima constat, superiora capessat necesse est. Ita, si dssipantur, procul a terris id evenit, sive permanent et conservant habitu suum, hoc etiam magis necesse est ferantur ad caelum.

(2) Ecquid scis, virtutem si unam amiseris,—etsi amitti non potest virtus, s si unam confessus fueris te non habere, nullam essete habiturum ? Num igi fortem virum, num magno animo, num patientem, num humana contemnent potes dicere Philoctetam illum ?

(3) Cum is dicat semper beatum esse sapientem, cui dicere hoc, si constare vellet, non liceret, quidnam faciendum est iis, qui nihil in bo pucendum, quod honestate careat, existimant ? Me quidem auctore eti Peripatetici veteresque Academici balbutire aliquando desinant aperte audeant dicere beatam vitam in Phalaridis taurum descensuram.

7. How does Cicero try to prove that pain is no evil at all ?

Or

What philosophical remedies against pain does Cicero propose ?

8. What do, according to Cicero, the *vitae bona vel commoda* contribut the happiness of man ?

9. Give an estimate of Cicero as a philosopher.

TUESDAY, 20TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LATIN—PAPER II.

JUVENAL—*Satires.* **TACITUS**—*Agricola and Germania.*

1. Translate :—

Atticus eximie si cenat, lautus habetur;
Si Rutilus, demens. Quid enim majore cachinno
Excipitur vulgi, quam pauper Apicius? Omnis
Convictus, thermae, stationes, omne theatrum
De Rutilo. Num dum valida ac juvenalia membra
Sufficiunt galeae, dumque ardent sanguine, fertur
Scripturus leges et regia verba lanistae
Multos porro vides, quos saepe elusus adipsum
Creditor introitum solet exspectare macelli,
Et quibus in solo vivendi causa palato est.
Egregius cenat meliusque miserremus horum
Et cito casurus jam perlucente ruina.
Interea gustus elementa per omnia quaerunt
Nunquam animo pretiis obstantibus: interius si
Attendas, magis illa juvant quae pluris emuntur.
Ergo haud difficile est perituram arcessere summam,
Lancibus oppositis vel matris imagine fracta,
Et quadringentis nummis condire gulosum
Fictile. Sic veniunt ad miscellanea ludi.

2. Translate :—

(*a*) Surgitur, et misso proceres exire jubentur
Consilio quos Albanam dux magnus in arcem
Traxerat attonitos et festinare coactos,
Tamquam de Cattis aliquid torvisque Sycambris
Dicturus, tanquam et diversis partibus orbis
Anxia praecipiti venisset epistola pinna
Atque utinam his potius nugis tota illa dedisset
Tempora saevitiae, claras quibus abstulit urbi
Illustresque animas impune et vindice nullo!
Sed periit postquam cerdonibus esse timendus
Coeperat: hoc nocuit Lamiarum caede madenti.

What are the persons and events referred to in the latter part of this passa

(*b*) Consumptis opibus vocem, Damasippe, locasti
Sipario clamosum ageres ut phasma Catulli.
Laureolum velox etiam bene Lentulus egit,
Judice me dignus vera cruce Nec tamen ipsi
Ignoscas populo; populi frons durior hujus
Qui sedet et spectat triscurria patriciorum,
Planipedes audit Fabios, ridere potest qui
Mamercorum alapas Quanti sua funera vendant
Quid refert? Vendunt nullo cogente Nerone,
Nec dubitant celsi praetoris vendere ludis,

3. What is the origin of the word *Satire*? Write a short history of this literary form in Latin literature.

Or

Quote Juvenal's definition of the office of the satirist, and consider how far he fulfils it.

4. Explain the following lines, noting carefully the allusions they contain :—

(*a*) Pone Tigellinum, taeda lucebis in illa,
Qua stantes ardent, qui fixo pectore fumant,
Et latum media sulcum deducit arena.

(*b*) Creditur olim
Velificatus Athos, constratum classibus isdem
Suppositumque rotis solidum mare.

(*c*) Festino ad nostros et regem transeo Ponti
Et Croesum quem vox justi facunda solonis
Respicere ad longae jussit spatia ultima vitae.

5. Translate :—

(*a*) An eandem Romanis in bello virtutem quam in pace lasciviam adesse creditis? Nostris illi dissensionibus ac discordiis clari vitia hostium in gloriam exercitus sui vertunt; quem contractum ex diversissimis gentibus ut secundae res tenent, ita adversae dissolvent. Nos terrarum ac libertatis extremos recessus ipse ac sinus famae in hunc diem defendit: nunc terminus Britanniae patet. Atqui omne ignotum pro magnifico est; sed nulla jam ultra gens, nihil nisi fluctus ac saxa et infestiores Romani quorum superbiam frustra per obsequium ac modestiam *effugeris*. Raptores orbis, postquam cuncta vastantibus defuere terrae, jam et mare scrutantur; si locuples hostis est, avari, si pauper, ambitiosi, quos non Oriens non Occidens satiaverit: soli omnium opes atque inopiam pari adfectu concupiscunt. Auferre, trucidare, rapere falsis nominibus imperium, atque ubi solitudinem faciunt pacem appellant.

(*b*) Mare scrutantur ac soli omnium sucinum, quod ipsi glaesum vocant, inter vada atque in ipso litore legunt. Nec quae Natura quaeve ratio gignat ut barbaris, quaesitum compertumve; diu quin etiam inter cetera ejectamenta maris jacebat, donec luxuria nostra dedit nomen. Ipsis in nullo usu; rude legitur, informe profertur, pretiumque mirantes accipiunt. Sucum tamen arborum esse *intelligas* quia terrena quaedam atque etiam volucria animalia plerumque interlucent, quae implicata umore mox durescente materia cluduntur. Fecundiora igitur nemora lucosque et sicut Orientis secretis ubi tura balsamaque sudantur, ita Occidentis insulis terrisque inesse *crediderim*, quae vicini solis radiis expressa atque liquentia, in proximum mare labuntur ac vi tempestatum in adversa litora exundant.

(*c*) Comment on the syntax of the subjunctives *effugeris*, *intelligas*, *crediderim*, in the above passages.

6. Translate each of the following passages, with careful explanations of difficulties in their meaning, and of any allusions they may contain :—

(*a*) Scilicet extrema et plana terrarum humili umbra non erigunt tenebras, infraque cœlum et sidera nox cadit.

(*b*) Ita nationis nomen non gentis evaluisse paulatim, ut omnes primum a victore ob metum, mox etiam a se ipsis invento nomine Germani vocarentur.

) Non numeraverim inter Germaniae populos, quamquam trans Rhenum uviumque consederint, eos qui decumates agros exercent; levissimus quisque lorum et inopia audax dubiae possessionis solum occupavere; mox limite acto motisque praesidiis sinus imperii et pars provinciae habentur.

. Describe the social and political organization of the Germans as pictured Tacitus; and consider what light he throws upon the origin of English litical institutions.

3. "Tacitus was a master of Epigram, and in this he shews himself a true ild of his age."

Explain and illustrate this statement.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LATIN (*Transalation*).

SECTION I.

1. Translate :—

(*a*) Multas per gentes et multa per aequora vectus,
   Advenio has miseras, frater ad inferias,
Ut te postremo donarem munere mortis
   Et mutam nequicquam alloquerer cinerem.
Quandoquidem fortuna mihi tete abstulit ipsum,
   Heu miser indigne frater adempte mihi,
Nunc tamen interea haec prisco quae more parentum
   Tradita sunt tristi munere ad inferias,
Accipe paterno multum manantia fletu,
   Atque in perpetuum, frater, ave atque vale.

(*b*) Hi mores, haec duri immota Catonis
Secta fuit; servare modum, finemque tenere
Naturamque sequi patriaeque impendere vitam;
Nec sibi sed toti genitum se credere mundo.
Huic epulae, vicisse famem; magnique penates,
Submovisse hiemem tecto: pretiosaque vestis,
Hirtam membra super Romani more Quiritis,
Induxisse togam; Venerisque hic maximus usus,
Progenies; Urbi pater est Urbique maritus,
Justitiae cultor, rigidi servator honesti.

2. Translate :—

Non tulit ferociam barbari dux exercitus Erygius, gravis quidem aetate sed et corporis robore nulli juvenum postferendus. Is galea dempta, canitiem ostentans, "Venit," inquit, "dies, quo aut victoria aut morte honestissima quales amicos et milites Alexander habeat ostendam." Nec plura elocutus equum in hostem egit. Crederes imperatum ut acies utraeque tela cohiberent: protinus certe recesserunt, dato libero spatio; intenti in eventum non duorum modo sed suae sortis quippe alienum discrimen secuturi. Prior barbarus emisit hastam, quam Erygius modica capitis declinatione vitavit, at ipse infestam sarissam, equo calcaribus concito, in medio barbari gutture ita fixit ut per cervicem emineret.

Praecipitatus ex equo barbarus adhuc tamen repugnabat; sed ille extractam ex vulnere hastam rursus in osdirigit. Satibarzanes hastam manu complexus quo maturius interiret ictum hostis adjuvit; et barbari duce amisso quem magis necessitate quam sponte secuti erant, tunc haud immemores meritorum Alexandri, arma Erygio tradunt.

SECTION II.

Translate :—

In the games of Honorius the inhuman combats of gladiators polluted, for the last time, the amphitheatre of Rome. The Christian poet Prudentius had exhorted the emperor to extirpate, by his authority, the horrid custom, but his pathetic appeal was less effectual than the generous boldness of Telemachus, a monk (=*monachus*) from Asia. The Romans were provoked by the interruption of their pleasures; and the rash monk, who had descended into the arena to separate the gladiators, was overwhelmed under a shower of stones. But the madness of the people soon subsided; they respected the memory of Telemachus, who had died a martyr in the cause of humanity, and they submitted, without a murmur, to the laws of Honorius, which abolished for ever these human sacrifices. The conservative among the citizens might perhaps insinuate that the last remains of a martial spirit were preserved in this school of fortitude, which accustomed the Romans to the sight of blood and to the contempt of death: a vain and cruel prejudice, so nobly confuted by the valour of ancient Greece, and of modern Europe.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

FRENCH—PAPER I.

SECTION I.

MOLIÈRE—*Le Tartuffe*.

E. HUGUET—*Portraits et Récits du XVI Siècle.*

1. Translate, and shortly indicate, the context of the following 10 passages :—

Acte I, sc. 1. Madame Pernelle, à Elmire :

. . . . . . Ces visites, ces bals, ces conversations
Sont du malin esprit toutes inventions.
Là, jamais on n'entend de pieuses paroles ;
Ce sont propos oisifs, chansons et fariboles :
Bien souvent le prochain en a sa bonne part,
Et l'on y sait médire et du tiers et du quart.
Enfin les gens sensés ont leurs têtes troublées
De la confusion de telles assemblées :
Mille caquets divers s'y font en moins de rien ;
Et, comme l'autre jour un docteur dit fort bien :
C'est véritablement la tour de Babylone,
Car chacun y babille, et tout du long de l'aune.

Acte IV, sc. 1. Cléante :

Hé ! monsieur, n'ayez point de ces délicates craintes,
Qui d'un juste héritier peuvent causer les plaintes.
Souffrez, sans vous vouloir embarrasser de rien,
Qu'il soit, à ses périls, possesseur de son bien,
Et songez qu'il vaut mieux encor qu'il en mésuse,
Que si de l'en frustrer il faut qu'on vous accuse.
J'admire seulement que, sans confusion,
Vous en ayez souffert la proposition.
Car enfin le vrai zèle a-t-il quelque maxime
Qui montre à dépouiller l'héritier légitime ?

2. Sketch the history of Tartuffe from its first appearance in 1664, to the first public performance in 1669; and review the principal objections raised against this play by the contemporaries of Molière. 15

3. Composition française :— 25

(a) Le personnage d'Orgon dans le Tartuffe de Molière : rôle qu'il joue dans la pièce, son caractère en partie comique, en partie odieux.

ou bien :

(b) Faites l'analyse de l'acte V du Tartuffe et discutez la remarque de Gœthe : "Le Tartuffe de Molière excite notre haine ; le dénouement par la police est donc très naturel, et très bien accueilli !"

SECTION II.

4. (a) Translate the following passage into English, and annotate the words in italics :— 12

Aux paroles du bon chevalier s'évertuèrent ses compagnons ; et en criant tous d'une voix : France ! France ! livrèrent un âpre et merveilleux assaut aux Lombards, lesquels commencèrent à perdre place et à *eux* reculer, toujours eux défendant très bien ; mais en ce reculement firent plus de quatre ou cinq milles, tirant vers Milan, où, quand ils se virent si près, tournèrent bride, et, à course de cheval, à qui mieux mieux, prirent leur fuite vers la ville. Les Français *chassèrent* tant qu'ils en furent bien près. Alors fut crié par quelqu'un des plus anciens, et qui fort bien entendait la guerre : "Tourne, homme d'armes, tourne !" à quoi chacun entendit, excepté le bon chevalier.

(b) Rewrite the following extract in modern French, and annotate the words in italics :—

Prenez-moi ces cornes là et les concassez un peu avec un pilon de fer, ou avec un landier, ce m'est tout un. Puis les enterrez en vue du soleil la part que vous voudrez, et souvent les arrosez. En peu de mois vous en verrez naître les meilleurs asperges du monde. Je n'en daignerais excepter ceux de Ravenne. A propos, si vous étiez *clerc*, vous sauriez que, *ès* membres plus inférieurs de ces animaux divins (ce sont les pieds), y a un os (c'est le talon, l'astragale, si vous voulez), duquel, non d'autre animal du monde, fors de l'âne indien et des Orcades de Libye, l'on jouait antiquement au royal jeu des tales, auquel l'empereur Octavian Auguste un soir gagna plus de cinquante mille ecus.

5. (a) Compare the narrative talents of Jacques de Mailles (Loyal Serviteur) and Nicolas de Troyes ; illustrate your assertions by a few distinct references to the extracts studied. 1

Or

(b) Summarize the extract : Prologue de l'Heptaméron, and appreciate the literary merits or demerits of the same.

6. Composition français :— 24

Rabelais: I l'homme ; II l'écrivain.

(1) Sa vie agitée, son caractère fougueux ;

(2) Fécondité de son génie ; moralité suspecte de son chef-d'œuvre ; qualités et défauts de sa langue.

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

FRENCH—PAPER II.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

J. MICHELET—*La Mer*.

1. Translate into English :— 15

Tout ce qui peut décourager les hommes se trouve réuni dès l'entrée de ces navigations du Nord. Bien avant le cercle polaire, un froid brouillard pèse sur la mer, vous morfond, vous couvre de givre. Les cordages se roidissent ; les voiles s'immobilisent ; le pont est glissant de verglas ; la manœuvre difficile. Les écueils mouvants qu'on a à craindre se distinguent àpeine. Au haut du mât, dans sa logette chargée de frimas,le veilleur, vraie stalactite vivante), signale, de moment en moment, l'approche d'un nouvel ennemi, d'un blanc fantôme gigantesque, qui souvent a deux cents, trois cents pieds au-dessus de l'eau.

Mais cette procession lugubre, qui annonce le monde des glaces, ce combat pour les éviter donnent plutôt envie d'aller plus loin. Il y a dans l'inconnu du pôle je ne sais quel attrait d'horreur sublime, de souffrance héroïque. Ceux qui sans tenter le passage, ont seulement été au Nord, et contemplé le Spitzberg, en gardent l'esprit frappé. Cette masse de pics, de chaînes, de précipices, qui porte à quatre mille cinq cents pieds son front de cristaux est, comme une apparition dans la sombre mer. Ses glaciers, sur les neiges mates, se détachent en vives lueurs vertes, bleues, pourpres, en étincelles, en pierreries qui lui font un éblouissant diadème.

2. Résumez et commentez en français ce que Michelet a écrit dans « La Mer » au sujet des découvertes maritimes et des expéditions polaires. 20

3. Treat in English one of the following subjects :— 15

(*a*) According to Jules Lemaître (Les Contemporains) : "Il serait excellent de remettre Michelet à la mode, parce qu'il a été une des grandes âmes les plus aimantes et les plus croyantes de ce siècle, et que nous avons surtout besoin qu'on nous réchauffe un peu." Give your reasons for thinking that the influence of Michelet is or is not beneficent, specially that it is or is not beneficent to young men.

(*b*) "La Nature si dure et si immorale, au sentiment de beaucoup de nos contemporains, est pour Michelet une inépuisable source de joie, de force et de foi. Il y renouvelle sa vie morale." (Gustave Lanson.) Show how

SECTION II.

A. DE VIGNY : *Poésies.*

4. Translate into English :— 15

Souvenir éternel ! Gloire à la découverte
Dans l'homme ou la nature, égaux en profondeur,
Dans le Juste et le Bien, source à peine entr'ouverte.
Dans l'Art inépuisable ; abîme de splendeur !
Qu'importe oubli, morsure, injustice insensee,
Glaces et tourbillons de notre traversée ?
Sur la pierre des morts croît l'arbre de grandeur.
Cet arbre est le plus beau de la terre promise,
C'est votre phare à tous, Penseurs laborieux !
Voguez sans jamais craindre ou les flots ou la brise
Pour tout trésor scellé du cachet précieux.
L'or pur doit surnager, et sa gloire est certaine :
Dites en souriant comme ce capitaine :
"Qu'il aborde si c'est la volonté des Dieux !"
Le vrai Dieu, le Dieu fort, est le Dieu des idées.
Sur nos fronts où le germe est jeté par le sort,
Répandons le Savoir en fécondes ondées ;
Puis recueillant le fruit, tel que de l'âme il sort,
Tout empreint du parfum des saintes solitudes,
Jetons l'œuvre à la mer, la mer des multitudes :
—Dieu la prendra du doigt pour la conduire au port.

5. Dégagez le sens d'un des poèmes suivants :— 20

(*a*) La Bouteille à la Mer.

(*b*) La Mort du Loup.

(*c*) Les Destinées.

et rattachez-le à l'ensemble des idées d'Alfred de Vigny.

6. Comment on and criticize A. de Vigny's ideas on one only of the 1
owing subjects :—

(*a*) The Role of the Poet in Modern Society.

(*b*) The Relation between Science and Poetry.

(*c*) Man's Attitude towards Nature.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

FRENCH (*Translation*).

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Translate into English :—

(*a*) J'aime beaucoup le Collège de France et cela pour diverses raisons. On y professe à la fois les plus vieilles sciences du monde et les plus nouvelles. L'enseignement qu'on y donne ne sert à rien ; aussi garde-t-il une noblesse incomparable. Il y est absolument libre, " M. M. les lecteurs et professeurs, comme dit l'affiche, traitent de ce qu'ils veulent et comme ils veulent . . . ." Quand on va au Collège de France, pour bien faire, il faut aller par la rue Saint-Jacques. C'est une rue mal pavée, etroite et tortueuse, mais noble et pleine de gloire. Car c'est là que furent établies, au temps du roi Louis XI, les presses du premier imprimeur parisien. Trois siècles cette voie fut honorée par d'illustres et doctes libraires, et maintenant ruinée et déchue elle est encore bordée d'étalages de bouquins latins et grecs. Là sous un ciel gris, dans l'ombre humide, sur le pavé gras, bousculé par les voitures, le pauvre poète qui aime le livre, parce que le livre est le rêve, s'arrête instinctivement devant les boîtes des bouquinistes. Il ouvre un petit classique de deux sous, de mine pitoyable et tout taché d'encre. Il lit et voit bientôt—ô magie—des figures de vierges passer dans leur tunique blanches. Il voit Antigone sous les lauriers sacrés. Et il s'en va, poursuivant, les pieds dans la boue, l'essaim des ombres héroiques et charmantes.

Anatole France (La Vie Littéraire).

(b) Que le séjour de l'homme est divin, quand la nuit
De la vie orageuse étouffe ainsi le bruit !
Ce sommeil, qui d'en haut tombe avec la rosée
Et ralentit le cours de la vie épuisée,
Semble planer aussi sur tous les éléments,
Et de tout ce qui vit calmer les battements.
Un silence pieux s'étend sur la nature ;
Le fleuve a son éclat, mais n'a plus son murmure ;
Les chemins sont déserts, les chaumières sans voix ;
Nulle feuille ne tremble à la voûte des bois ;
Et la mer elle-même, expirant sur sa rive,
Roule à peine à la plage une lame plaintive :
On dirait, en voyant ce monde sans échos,
Où l'oreille jouit d'un magique repos,
Où tout est majesté, crépuscule, silence,
Et dont le regard seul atteste l'existence,
Que l'on contemple en songe, à travers le passé,
Le fantôme d'un monde où la vie acessé.

Lamartine (Harmonies).

SECTION II.

2. Translate into French :—

(a) Utopia is the ideal land of perfection, located by the power of imagination in unknown regions of the sea, not far remote perhaps from those vast and solemn spaces which, according to modern explorers, sentinel the Poles. It is a place in which it is supposed there is a system of social arrangements whereby the highest happiness of the people is secured, and the highest good of the State attained. In this imaginary island of perennial bliss all are contented with the necessaries of life, and all are employed in useful labour. The streets in the cities are both "commodious and handsome", the gardens and the vineyards are delightful beyond comparison, the houses are built fire-proof, and markets and store-houses are open to all; thence the father of every family (lucky man !) can fetch and carry away what he has need of "without money, without exchange, without any gage, pawn, or pledge." Who would not live and end his days in such a land? It may frighten some of our ladies of society a bit if they are told that their Utopian sisters looked upon dress and jewellery as mere baubles fit only for children, and also held money in contempt; but that, perhaps they will say, is the only dark spot on an otherwise attractive picture.

(b) Let observation with extensive view
Survey mankind, from China to Peru ;
Remark each anxious toil, each eager strife,
And watch the busy scenes of crowded life :
Then say how hope and fear, desire and hate,
O'erspread with snares the clouded maze of fate,
Where wav'ring man, betray'd by vent'rous pride
To tread the dreary paths without a guide
As treach'rous phantoms in the mist delude,
Shuns fancied ills, or chases airy good :
How rarely reason guides the stubborn choice,
Rules the bold hand, or prompts the suppliant voice :
How nations sink by darling schemes opprest,
When vengeance listens to the fool's request.

WEDNESDAY, 27TH NOVEMBER.
[2-30 P. M. TO 5-30.]

AVESTA AND PAHLAVI—PAPER I.

Old Persian Behistûn Inscriptions, I—II.

Yashts—*Farvardîn and Zamyâd.*

SECTION I.

1. Transliterate and translate :—

𐎰.𐎠.𐎫.𐎡.𐎹 𐏐 𐎭.𐎠.𐎼.𐎹.𐎺.𐎢.𐏁 𐏐 𐎧.𐏁.𐎠.𐎹.𐎰.𐎡.𐎹 𐏐 𐎱.𐎿.𐎠.𐎺 𐏐 𐎠.𐎭.𐎶 𐏐 𐎲.𐎠.𐎲.𐎡.𐎽.𐎢.𐎶 𐏐 𐎠.𐏁.𐎡.𐎹.𐎺.𐎶 𐏐 𐎠.𐎲.𐎡.𐎹 𐏐 𐎠 𐎺.𐎶 𐏐 𐎴.𐎮.𐎡.𐎫 𐎲.𐎡.𐎼.𐎶 𐏐 𐏃.𐎹 𐏐 𐎴.𐎲.𐎢.𐎤.𐎭.𐎼.𐎨.𐎼 𐏐 𐎠.𐎥.𐎢.𐎲.𐎫.𐎠 𐏐 𐎣.𐎠.𐎼 𐏐 𐏃.𐎹 𐏐 𐎴.𐎮.𐎡.𐎫 𐎲.𐎡.𐎼.𐏃.𐎹.𐎠 𐏐 𐎫.𐎡.𐎥.𐎼.𐎠.𐎶 𐏐 𐎠.𐎭.𐎠.𐎼.𐎹 𐏐 𐎠.𐎺.𐎭.𐎠 𐏐 𐎠.𐎡.𐏁.𐎫.𐎫.𐎠 𐏐 𐎢.𐎫.𐎠 𐏐 𐎠.𐎲.𐎡.𐏁 𐏐 𐎴.𐎠.𐎻.𐎡.𐎹.𐎠 𐏐 𐎠.𐏃 𐏐 𐎱.𐎿.𐎠.𐎺 𐏐 𐎠.𐎭.𐎶 𐏐 𐎣.𐎠.𐎼.𐎶 𐏐 𐎶.𐏁.𐎣.𐎠.𐎢.𐎺.𐎠 𐏐 𐎠.𐎺.𐎠.𐎣.𐎴.𐎶 𐏐 𐎠.𐎴.𐎡.𐎹.𐎶 𐏐 𐎢.𐏁.𐎲.𐎠.𐎼.𐎡.𐎶 𐏐 𐎠.𐎤.𐎢.𐎴.𐎺.𐎶 𐏐 𐎠.𐎴.𐎡.𐎹.𐏃.𐎹.𐎠 𐏐 𐎠.𐎿.𐎶 (var. 𐎠 𐎿.𐎱.𐎠.) 𐏐 𐎳.𐎼.𐎠.𐎴.𐎹.𐎶 𐏐 𐎠.𐎢 𐎼.𐎶.𐏀.𐎭.𐎠.𐎶.𐎡.𐎹 𐏐 𐎢.𐎱.𐎿.𐎫.𐎠.𐎶 𐏐 𐎠.𐎲.𐎼 𐏐 𐎺.𐏁.𐎴.𐎠 𐏐 𐎠.𐎢.𐎼.𐎶.𐏀.𐎭.𐎠.𐏃 𐏐 𐎫.𐎡.𐎥 𐎼.𐎠.𐎶 𐏐 𐎻.𐎡.𐎹.𐎫.𐎼.𐎹.𐎠.𐎶.𐎠 𐏐

2. (*a*) Determine philologically your interpretation of the words underlined in the above passage.

(*b*) What do you know of the son of 𐎠𐎡𐎴𐎡𐎼. and his revolt against Darius?

(*c*) Describe the Babylonian 𐎶𐏁𐎣𐎢𐎺𐎠. from the etymological stand-point, and show how the latest decipherment is supported by Herodotus in his history of Babylon.

3. Translate, transliterating and explaining the words underlined:—

𐎰𐎠𐎫𐎡𐎹 𐏐 𐎭𐎠𐎼𐎹𐎺𐎢𐏁 𐏐 𐎧𐏁𐎠𐎹𐎰𐎡𐎹 𐏐 𐎱𐎿𐎠𐎺 𐏐 𐏃𐎢𐎺 𐏐 𐎳𐎼𐎺𐎼𐎫𐎡𐏁 𐏐 𐏃𐎭𐎠 𐏐 𐎣𐎶𐎴𐎡𐎲𐎡𐏁 𐏐 𐎠𐎿𐎲𐎠𐎼𐎡𐎲𐎡𐏁 𐏐 𐎠𐎸𐎰 𐏐 𐎼𐎥𐎠 𐏐 𐎴𐎠𐎶𐎠 𐏐 𐎭𐏃𐎹𐎠𐎢𐏁 𐏐 𐎶𐎠𐎭𐎡𐎹 𐏐 𐎠𐎺𐎱𐎼𐎠 𐏐 𐎠𐏁𐎡𐎹𐎺 𐏐 𐎱𐎿𐎠𐎺 𐏐 𐎠𐎭𐎶 𐏐 𐎣𐎠𐎼𐎶 𐏐 𐎳𐎼𐎠𐎡𐏁𐎹𐎶 𐏐 𐎴𐎡𐎱𐎮𐎡𐎹 𐏐 𐎳𐎼𐎺𐎼𐎫𐎡𐏁 𐏐 𐎠𐎥𐎼𐎲𐎡𐎹𐎫𐎠 𐏐 𐎠𐎴𐎹𐎫𐎠 𐏐 𐎠𐎲𐎡𐎹 𐏐 𐎶𐎠𐎶 𐏐 𐎠𐎭𐎶𐏁𐎡𐎹 𐏐 𐎢𐎫𐎠 𐏐 𐎴𐎠𐏃𐎶 𐏐 𐎢𐎫𐎠 𐏐 𐎥𐎢𐏁𐎠 𐏐 𐎢𐎫𐎠 𐏐 𐏃𐏀𐎲𐎠𐎴𐎶 𐏐 𐎳𐎼𐎠𐎩𐎴𐎶 𐏐 𐎢𐎫𐎠𐏁𐎡𐎹 𐏐 𐎢𐎨𐏁𐎶 𐏐 𐎠𐎺𐎩𐎶 𐏐 𐎯𐎢𐎺𐎼𐎹𐎠𐎶𐎡𐎹 𐏐 𐎲𐎿𐎫 𐏐 𐎠𐎭𐎠𐎼𐎡𐎹 𐏐 𐏃𐎽𐎢𐎺𐏁𐎡𐎶 𐏐 𐎣𐎠𐎼 𐏐 𐎠𐎺𐎡𐎴 𐏐 𐎱𐎿𐎠𐎺𐏁𐎡𐎶 𐏐 𐏃𐎥𐎶𐎫𐎠𐎴𐎡𐎹 𐏐 𐎢𐏀𐎶𐎹𐎠𐎱𐎫𐎡𐎹 𐏐 𐎠𐎤𐎢𐎴𐎺𐎶 𐏐 𐎢𐎫𐎠 𐏐 𐎶𐎼𐎫𐎡𐎹𐎠 𐏐 𐎫𐎹𐎡𐏁𐎡𐎹 𐏐 𐎳𐎼𐎫𐎶𐎠 𐏐 𐎠𐎵𐎢𐏁𐎡𐎹𐎠 𐏐 𐎠𐏃𐎫𐎠 𐏐 𐎠𐎺𐎡𐎹 𐏐 𐏃𐎥𐎶𐎫𐎠𐎴𐎡𐎹 𐏐 𐎠𐎫𐎼 𐏐 𐎮𐎡𐎭𐎠𐎶 𐏐 𐎳𐎼𐎠𐏃𐎩𐎶 ∘

4. (*a*) Mention some essential points in which Herodotus agrees with Darius's own narrative of Gaumâta on his Inscriptions, and somewhere he varies from it.

(*b*) Prove by examples the relationship existing between the Ancient Persian of the age of Darius and the Gâthic-Avesta dialect.

(c) Exemplify the passive aorist, reduplicated perfect, infinitive, and passive participle, giving their Indô-Irânian equivalents.

5. Write down in cuneal letters, annotate and parse fully:—

Bâjim—uvâipashiyam—caxriyâ—darshma — patiyâvahyaiy—jiyamnam—ashhaiy—avaharja.

SECTION II.

6. (a) Which do you consider the most original of all the Yashts? Give your own estmate of its value, from the historical and literary points of view. Answer the question as fully as you can.

(b) Enumerate some of the well-known holy women referred to in the *Farvardîn* Yasht, and state what you know about the position of woman in ancient Iran.

7. Mention some of the chief characteristics and functions of the *Fravashis*. How do you account for the *Fravashis* of the living righteous being more powerful than those of the dead? What notions have you formed about [illegible] from your study of the *Farvardîn* Yasht?

Or

Examine and annotate the following statement:—

"The Iranian idea of 'holiness' is quite in keeping with the practical character of the religion. It is no cloistered virtue, divorced from conduct, but connotes *beneficence.*"

8 Translate literally into English any three of the following passages, annotating the words underlined:—

[illegible] (a)
[illegible]
[illegible]

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible] (b)
[illegible]

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(c) [illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(d) [illegible]
[illegible]

* [illegible]
[illegible]
[illegible]
* [illegible]

Scan the lines marked with an asterisk.

9. Explain and comment upon any four of the following passages:—

(a) [illegible]
[illegible]

(b) [illegible]
[illegible]

(c) [illegible]
[illegible]

(d) [illegible]
[illegible]

(e) [illegible]
[illegible]

[illegible] (all MSS) [illegible] (*f*)
[illegible]
[illegible]

[illegible] (*g*)
[illegible]

[illegible] (*h*)
[illegible]
[illegible]

10 Annotate :—

[illegible]
[illegible]
[illegible]

THURSDAY, 28TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

AVESTA AND PAHLAVI—PAPER II.

Yasna (Avesta and Pahlavi) *XLVII—LII.*
Shikand-gâmânîk Vijâr, Pahlavi and Pazand Texts, Chapters I—V.

SECTION I.

1. (*a*) Compare the Gathic with the later Avestic conception of Ahu Mazda, the Amesha-Spentas, and Zarathushtra.

(*b*) Give a short account of Zarathushtra's eschatology. What [illegible] ?

2. (*a*) How would you prove the antiquity of the Gathas?

(*b*) Examine and annotate the following statement :—

"The last decade has brought about a complete revolution, both the field of the Awesta and the Veda, in the views taken of the inc genous tradition, and has made converts or adherents of those who in t' beginning were opponents."

What is your opinion about the Pahlavi translation of the Avesta general, and of the Gathas in particular? Which do you think is t best method of studying the Avesta? Support your statement by refe ences to or citations from the text studied by you.

3. (*a*) Translate literally into English, annotating the words und lined :—

[illegible]
[illegible]

[illegible]
[illegible]

(*b*) Explain and comment upon, marking out the glosses :—

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

4 (*a*) Translate and annotate :—

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

(*b*) What are the chief features of the Avestic metre ?

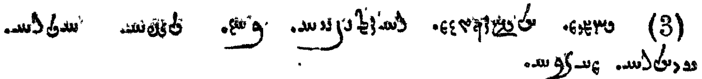
5. (*a*) Write exegetic notes on the following, with special reference to the words underlined :—

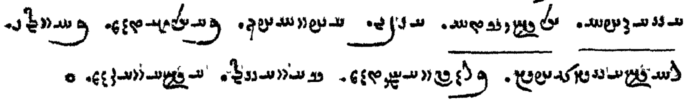
(1) [illegible]
[illegible] (var. [illegible]) [illegible]
[illegible]

(2) [illegible]
[illegible]

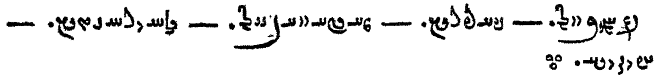
[illegible]
[illegible]
[illegible]

(3)





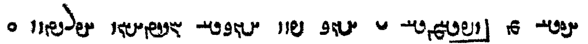
(*b*) Annotate :—



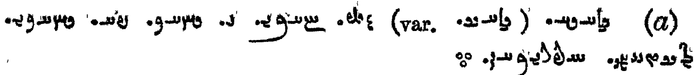
SECTION II.

6. Translate from Pahlavi into English, and comment on the Pahlavi text with reference to the Pazand, suggesting emendations where necessary :—

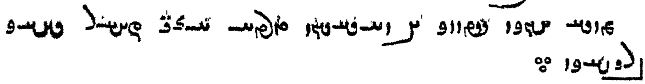
(*a*)



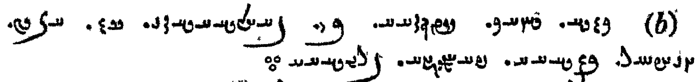
(*a*) (var.)



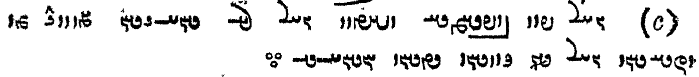
(*b*)



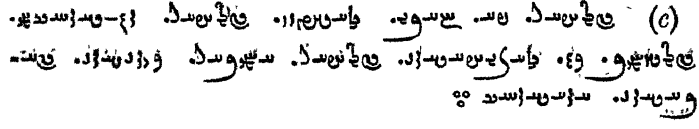
(*b*)



(*c*)

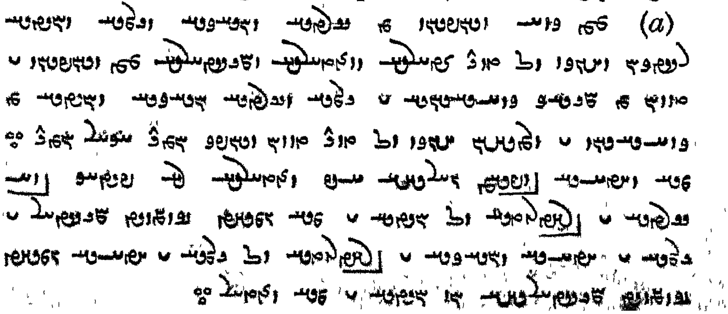


(*c*)

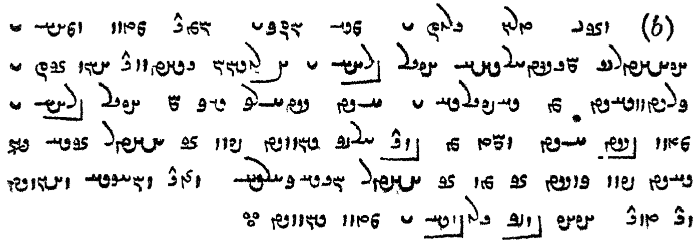


7. Translate into English and explain fully the following passages :—

(*a*)

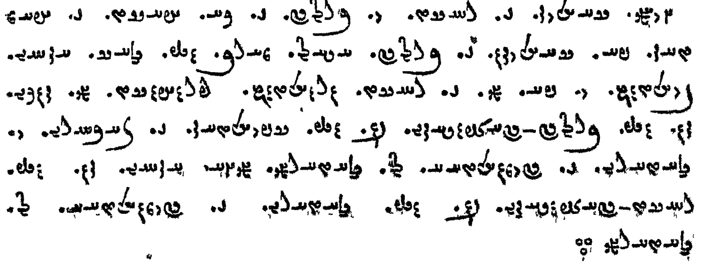


(b)



What other Pahlavi writer refers to the same mythical idea regarding the cause of eclipses? Mention the work and the context.

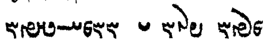
8 (a) Translate into English :—



(b) To what parts of speech are pronominal suffixes attached in Pazand? What results are produced when a pronominal suffix is attached to a relative? How are the preterite and passive verbs formed in Pazand? Give examples.

(c) Estimate the usefulness of the Pazend text in the study of the extant Pahlavi *Shikand-gûmânik Vijâr*. Is it an accurate transcript of the original Pahlavi?

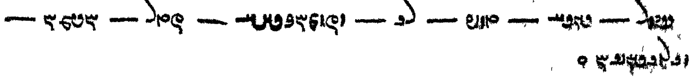
9. (a) What estimate do you form of—



(1) as a controversialist, (2) as a religious teacher, and (3) as a Pahlavi writer?

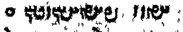
(b) State and criticize the author's arguments set forth in reply to the question: "Why Auharmazda should be the author of the good creation only, when the celestial sphere includes the good stars as well as the seven evil planets which destroy the good work of the Deity?"

10. (a) Annotate :—



(b) What do you know about :—

(1)

(2) 

(3)

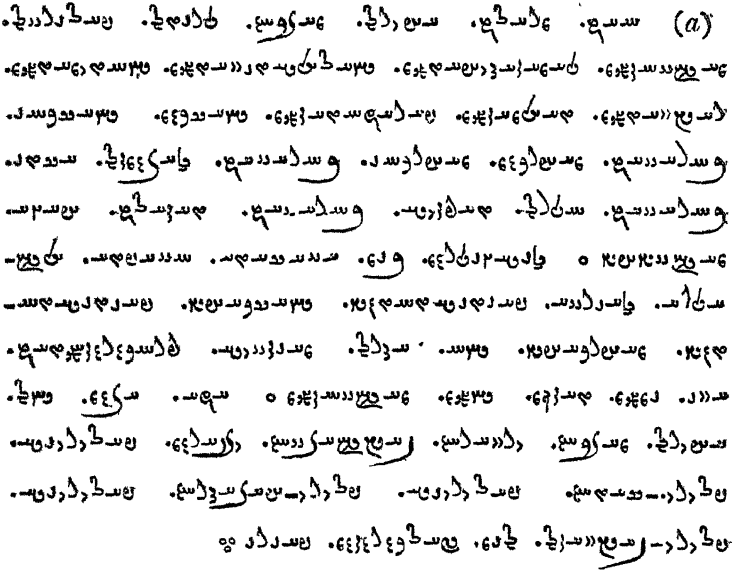
FRIDAY, 29TH NOVEMBER.

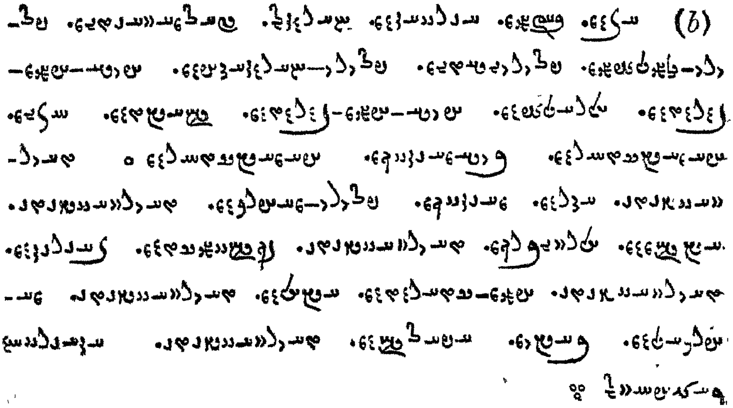
[2-30 P.M. TO 5-30 P.M.]

AVESTA AND PAHLAVI—(*Translation*).

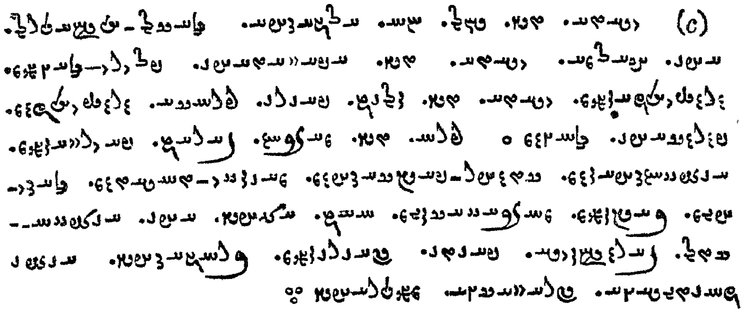
SECTION I.

1. Translate into English :—





(c)



2. Translate into Avesta :—

(a) I come into this world, I accept evil, I resign myself to death with the mind in joy and the soul in bliss. May the accursed Aharman be smitten, destroyed and broken, he who has evil knowledge, who is full of death, who destroys the body of the immortal soul! May the immortal soul have its share in Paradise, and may the pleasure and comfort that will dissipate the pain of the immortal soul come to us!

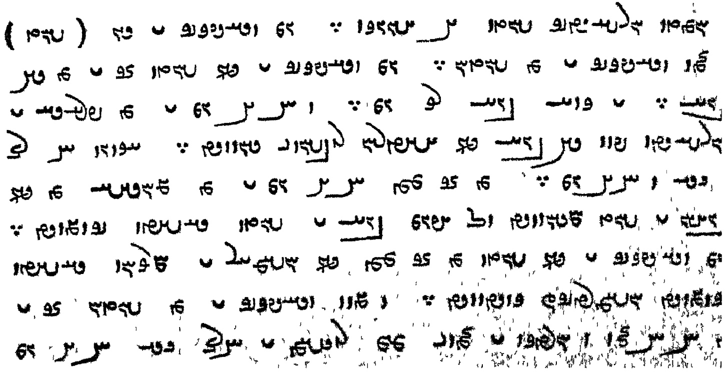
(b) If an honest man working hard and teaching the holy wisdom, have no sufficient living, and think of getting sufficient milk; if such a one only recite the prayers, he who celebrates the festival cannot charge him with non-celebration, for as far as he recites the prayers, he has celebrated the festival.

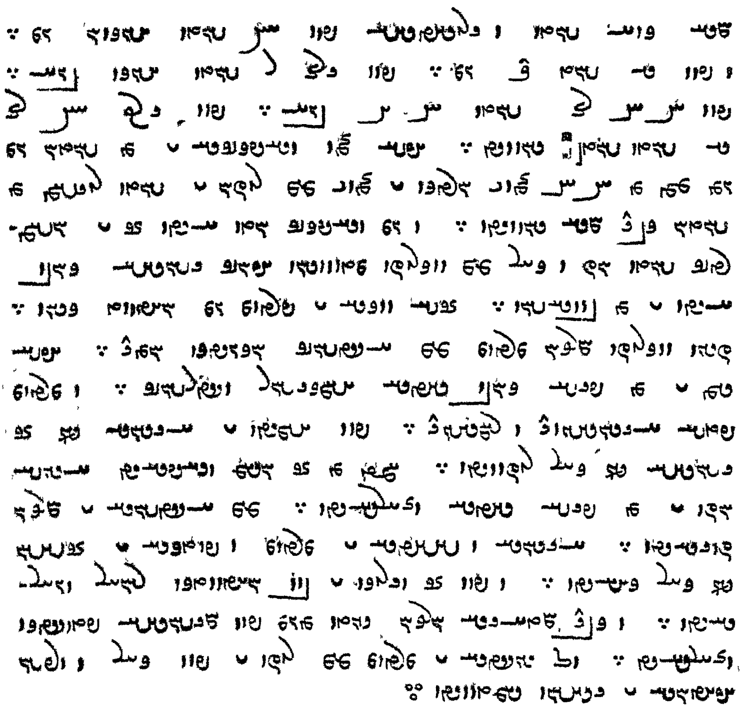
(c) Thereupon Vohuman spoke to Zarathushtra:—

"Put off this garment which thou wearest, so that we shall confer with Him by whom thou art produced, and by whom I am produced who is the most bountiful of spirits, the most beneficent of existences, whose friend I am, who am Vohuman." Vohuman carried in his hand a symbol of spiritual peacefulness which demonstrated that it was obligatory to move so harmlessly in this world, that there would be peace with everybody.

SECTION II.

3. Translate into English :—





4. Translate into Pahlavi:—

The people of Iran suffered not only from the heat of summer, but also from the cold of winter; the scorching winds of the desert were not more to be dreaded than the snow-storms of the northern tablelands. Here pastures and cornfields were buried under snow during many weeks; there sand-drifts destroyed culture. Here the camels died of cold and slipped down the icy steeps into precipices; there the winds from the desert choked up the wells and springs. Here was winter "with the worst of its plagues", "cold for the waters, cold for the earth, cold for the trees", there the cattle were tortured by gadflies in the heat; here bears and wolves invaded the herds, there snakes had to be guarded against and the fiercer wild beasts. The influences which such conditions of life must perforce have exerted on a naturally gifted and high-spirited race, brave, doughty, and robust, are incalculable. It is entirely owing to them that the Iranians became what we find them at their entrance on the stage of history—a people of most noble presence, of manly beauty of the heroic cast, indomitable fighters, earnest and honest of mind, of a serious and practical turn, far more given to the work of life than to its graces and amenities. It is evident that their moral and religious sense must have been vastly modified and shaped by the same influences.

WEDNESDAY, 27TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PERSIAN—PAPER .

1. Anwari has been called one of the three Prophets of Persian Verse Examine carefully, in Persian, the correctness of this view.

2. Describe in the language of Qaâni :—

   (*a*) A cannon.
   (*b*) Clouds.
   (*c*) Nightfall.

3. Summarise the views of Anwari and Qaâni on Predestination.

4. Write a short account of—

(*a*) Al-Muqanna' and (*b*) the Mo'tazilla sect.

5. Annotate :—

مسجد الاقصی - زاد فی الطنبور - مجد همگر - بشیر و نذیر - شاه لافتی - آل عبا - شق القمر - حنانه

6. (*a*) Distinguish between :—

(*a*) ترجیع بند and ترکیب بند
(*b*) تشبیب and گریز
(*c*) مطلع and مقطع

(*b*) Scan and name the metres of—

(*a*) یزدان ندهد مرتبه جز مرتبه دان را
(*b*) قصور عقل تصور کند جلالت تو
(*c*) حرمت شیب یافتم بشباب
(*d*) یک عالم و صد هزار جاهل
(*e*) نیک و بد روزگار جمله یقین است
(*f*) ناصیهٔ سکه را نام تو مطلوب گشت
(*g*) فگنده اند همهمه کشیده اند زمزمه

7. Paraphrase :—

(*a*) روزی که دوان بر اثر آتش شمشیر
چون باده خورد شیر علم شیر اجم را

در نعره خناق آرد و در جلوه تشنج
گر باس تو یاری ندهد کوس و علم را
یک ناله که کلک تو کند در مدد ملک
آنجا که عدو جلوه دهد بخت دژم را
با فایده‌تر زانکه همه سال و همه روز
از شست کمان ناله دهد پشت بخم را
بدخواه تو بر سکنهٔ این تختهٔ خاکی
صفریست که بیشی ندهد هیچ رقم را
در بزمگهت چهره بعیوق نموده
ناهید فلک شعبدهٔ مثلث و بم را

(b) درین بهار دلنشین که کشته خاک عنبرین
زمن ربوده عقل و دین نگاری از نگارها
رفیق جو شفیق خو عقیق لب شقیق رو
رقیق دل دقیق مو چه موزمشک تارها
بطره کرده تعبیه هزار طبله غالیه
بمژه بسته عاریه برنده ذوالفقارها
مهی دو هفت سال او سواد دیده خال او
شگفته از جمال او بهشتها بهارها
دو کوزه شهد بر لبش دو چهره ماه نخشبش
نهفته زلف چون شبش بتارها تتارها
سهیل حسن چهر او دو چشم من سپهر او
مدام مست مهر او نبیدها عقارها

8. Translate and expla n ful'y :—

(a) بادام دو مغزست که از خنجر الماس
نا داده لبش بوسه سراپای فسان را

گر بارہ کشد راعی عزمش نبود راہ
جز خارج او نیز نزول حدثان را
ور پرہ زند لشکر عزمش نبود تک
جز داخل او نیز ردیف سرطان را

(b) برجای عطارد بنشاند قلم تو
گر در سر منقار کشد جذر اصم را

(c) جرعۂ جام لبت پردۂ عیسی درید
نقطۂ نون خطت خامۂ آذر شکست
تیزی تیغش ببرد گرمی آتش بہ بین
نوع چو جنس از عرض نفس چو جوہر شکست
کرد بشیر علم خانۂ خورشید دو
گرچہ بمثال چتر قدر دو پیکر شکست
مرگ ز پاس تو بود اینکہ بچشم ستم
در شد و چون دست یافت پای برادر شکست
از حسد فتح تو خصم تو پی کرد اسپ
ہمچو جحی کز خدوک چرخۂ مادر شکست

(d) ہمہ در ششدر عجز اند و ترا داو بہ ہفت
ضربہ بستان و بزن زانکہ تمامی ند بست

(e) می از مینای لاخوردہ سبق از ما سوا بردہ
وز آن پس سر بر آوردہ ز جیب جامۂ الا
زدہ در دشت لا خرگہ کہ لا معبود الا اللہ
ز کاخ نفی جستہ رہ بخلوت گاہ استثنا
رموز علم ادریسی بود ذوقی نہ تدریسی
چہ داند ذوق ادریسی رموز علم الاسما

پس از لطف حق تا جهت طریق شرع منهاجت
بساط قرب معراجت فسبحان الذی اسری
مهین نو باوهٔ آدم بهین پیرایهٔ عالم
چو خیر المرسلین محرم بخلوتگاه او ادنی

(*f*) خاک راه بو ترا بست این ملک کز رشک او
آسمان گوید همین یا لیتنی کنت تراب

(*g*) هادی خود نفس سرکش را گزینم ای شگفت
گرچه صد کرت شنیده ستم اذا کان الغراب

(*h*) نی ترا ممکن توان گفتن نه واجب لیک حق
بعد ذات خویشتن ذات ترا کرد انتخاب

(*i*) کای عطارد خال ای مه زهره ات را مشتری
خوشدلم کز کید مریخ و زحل رست آفتاب

(*j*) تا همی گویند کز زور امامت مرتضی
باب و انگشت یداللهی در از خیبر گرفت

(*k*) ز ابجد عاشق جیمم بدنیا طالب سیمم
که رنگ این و شکل آن نشان زان موی و تن دارد

THURSDAY, 28TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PERSIAN—PAPER II.

1. When, where and under what circumstances was the *Akhlaq-e-Jal* composed? To whom was it dedicated? What were the literary characterist of the age, and how far are they reflected in the book? Compare it with ot prose works of the period.

2. Summarise Dawwani's views on—
   - (*a*) Female education.
   - (*b*) The object of man's creation, and
   - (*c*) The question whether Philosophy "leads to the dissolution of bonds of Religion".

3. Annotate :—

اعتدال جمادی و اعتدال انسانی - صور اسماء - وحدت عددی و وحدت ذاتی حق - ہتیہ پول - شش ہزاری ششہزار سوار - شکل بدیہی الانتاج - شکل لحیانی

4. Explain with reference to the context :—

(a) بحسب نشاء قدسی فاتحہ کتاب ابداع و اختراع بصورت انسی دیباچۂ مکارم اخلاق و لطائف اصطناع

(b) باین سند کہ در اتمام طی نردبان یک زینہ درمیان ماند بر مذہب نظام کہ بطفرہ قائل ست برہان سلم مسلم شد

(c) چہ امارت بر استحکام قواعد این دولت قاہرہ اجلی و اعلی از آنکہ صبح ظہورش از مطلع بضع سنین سر برزد

(d) مانند روی در آخر بیوت اردو باشی

(e) تیر و کمانش منضم باہم الف و نونیست شدہ کہ بر تحقیق اثبات قضیۂ فتح دالست یا بخلاف اصل مشعر بنفی و زوال دشمن بد افعال

(f) سخن فہمی عالم بالا معلوم شد

(g) آسمان را سر شد و از جان بکاست
صبح رویش تا قرین زلف خاست
شد بہ انسان لطف بی پایان او
کاول شب می نماید صبح رو

(h) یکی گفت آنچہ او می داند ما می بینیم
دیگر گفت آنچہ او [illegible]

5. State briefly what you know of—

حضرت یعسوب المسلمین - ابن مسکویه - خانبهادر فیروز جنگ

6. Reproduce in your own words (in Persian)—

(*a*) some of the striking metaphors and similes used in the description of the sword, the arrow and the horse of the patron of Dawwani; and

(*b*) the story of ملکشاه and the امام الحرمین

7. (*a*) What are the causes which excite غضب What remedies have been recommended for its suppression?

(*b*) How do you account for the insertion of the section on Music in the *Akhlaq-e-Jalali*?

8. (*a*) Sketch the condition of Persian literature under Aurangzib.

(*b*) Form an estimate of the وقائع as a (*a*) historical and (*b*) literary work.

9. Translate into English:—

(*a*) سخن در تحقیق عبادت الهی آنکه حق
سبحانه و تعالی هر یک قوی و اعضا را بجهت
غایتی خلق فرموده تا مجموع اسباب تحصیل کمال
حقیقی که غایة الغایاتست شود اعنی تحقیق بسر خلافت
الهی چنانچه در مطلع پرتو ادراک آن بر روازن
ضمائر مقتبسان انوار حکمت عملی افتاد پس صرف
آن قوی و اعضا دران غایات عبادت و عدالت
و شکر باشد و صرف درغیر آن معصیت و ظلم و کفران
و چون التزام این معنی در غایت صعوبت ست
در کلام حقائق اعلام این طائفه را وصف بقلت
فرموده حیث قال و قلیل من عبادی الشکور و تفصیل
وظائف اعمال هر قوتی از قوی در شریعت محمدی
با بلغ وجهی مشروح شده و همچنین حقوق الناس

نیز در معاملات و مناکحات و جنایات مبین و مفصل گشته ازانجا تلقی باید نمود و اعم وجوه عدالت و اهم آن عدالت سلطانست که احاطه بر تمام وجوه عدالت دارد چه بی عدالت پادشاهی هیچکس را مکنت رعایت عدالت نتواند بود و اگر باشد در غایت تعسر

(b) فرقهٔ شمشیر بدست ناخن پای قلعه شدند و جوقی کمان بر بازو بروت لب خندق تا حجام قضا کی رسد گروهی چون نفس نائی در کوچهٔ راه نقب در آمدند و فریقی همچو صدای مطرب بر دمدمه بلند گشتند تا سرمه باروت چه کند جمعی پریشان روزگار هرزه گرد سیار هر لحظه رشته وار سر از جای بر آورده گوهر تماشا برشته نگاه میکشیدند که شاید گرهی. از دل وا شود و طائفه قطره زنان مانند آب هر طرف میدویدند و چشم را آب می دادند باشد که گرد کلفتی از خاطر برود فی الواقع دریولا که طراوت عرصه لشکر فیروزی اثر رشک فرمای گلزارست و رنگینی جلوه فوج دریا موج خوبی افزای بهار پنجه مژگان چرا رنگ بست حنای تماشا نگردد و مد نگاه از چه رو میل توتیای تفرج ننماید چشمه سارها در نظر از حلقه زره پوشان سروهای روان نمایان از فرقه بندق بدوشان نیستان از فوج نیزه داران پیدا و مزرع کوکنار از صف گرز برداران هویدا

FRIDAY, 29TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PERSIAN (*Translation*).

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. Translate into Persian :—

(*a*) Sweep away the Illusion of Time; glance, if thou have eyes, from the near moving-cause to its far distant Mover: The stroke that came transmitted through a whole galaxy of elastic balls, was it less a stroke than if the last ball only had been struck, and sent flying? Oh, could I transport thee direct from the Beginnings to the Endings, how were thy eyesight unsealed, and thy heart set flaming in the Light-sea of celestial wonder! Then sawest thou that this fair Universe, were it in the meanest province thereof, is in very deed the star-domed City of God; that through every star, through every grass-blade, and most through every Living Soul, the glory of a present God still beams. But Nature, which is the Time-vesture of God, and reveals Him to the wise hides Him from the foolish.

(*b*) Generation after generation takes to itself the Form of a Body; and forth-issuing from Cimmerian Night, on Heaven's mission *APPEARS*. What Force and Fire is in each he expends: one grinding in the Mill of Industry; one hunter-like climbing the giddy Alpine heights of Science; one madly dashed in pieces on the rocks of Strife, in war with his fellow:—and then the Heaven-sent is recalled; his earthly Vesture falls away, and soon even to Sense becomes a vanished Shadow. On the hardest adamant some foot-print of us is stamped in; the last Rear of the host will read traces of the earliest Van. But whence?—O Heaven, Whither? Sense knows not; Faith knows not; only that it is through Mystery to Mystery, from God and to God.

We *are such stuff*
As Dreams are made of, and our little Life
Is rounded with a sleep!

(*c*) Perhaps in this neglected spot is laid
Some heart once pregnant with celestial fire;
Hands, that the rod of empire might have sway'd,
Or waked to ecstasy the living lyre.

But Knowledge to their eyes her ample page
Rich with the spoils of time did ne'er unroll;
Chill Penury repress'd their noble rage,
And froze the genial current of the soul.

Full many a gem of purest ray serene
The dark unfathom'd caves of ocean bear:
Full many a flower is born to blush unseen,
And waste its sweetness on the desert air.

SECTION II.

2. Translate into English :—

(*a*) سجدهٔ محمدت ایزدی بفرق قلم به تقدیم
میرسد نی نی قلم خط به بیشی میکشد که تصویر نگارین
سرای سپاس الٓهی از قدرت نقاش حدوث و مصور

امکان بیرونست اگر به بنای آسمان و عمارت زمین
نیایش او نموده آید در خطوط شعاعی بصیرت ازآن
نکوهیده تر باشد که پادشاه جهان آرای را بتعمیر
دیوار گلین و سقف چوبین ستایش نمایند و اگر درین
کار شگرف برنگ آمیزی مجردات بامادیات که
مرقع موجودات عبارت از آنست توسل جوید
هر آئینه شرح جمال غیر منتهی را به دست آویز
منتهی پرداخته باشد - سبحان الله این چه خط
قاصر نمط است که نگارش می یابد کلک تقدیر منصب
حامدیت نقطهٔ وجود را بر صور ایجادی و نقوش
تکوینی نوشته است - من حرف نشناس این سواد
نورانی ازآن عزیمت باز آمده دل را بخیال جلائل
نعوت پادشاه زمان پیر وقت مرشد روزگار نور آگین
می گرداند و زبانرا بگفتار آثار نتائج حق شناسی و
ایزد پرستی خدیوزمان نگارین می سازد دست را
بادل همزبان می کند و قلم چوبین را بازبان گوشتین
همراز میگرداند یعنی شکر نعمت منعم حقیقی بر دیباچهٔ
اعلان نقش پذیر میگردد که ایزد جهان آر زمان
مارا طراز زمانهای باستانی گردانید و صورت را
پایهٔ معنی بخشید ظاهر را همرنگ باطن ساخت تقلید
را تحقیق گردانید چرا زمانه نبالد و چگونه زمانیان
ننازند آلروز هنگامه گفتار بود امروز معرکهٔ کردار

هر دو در خلوتکده وحدت همرازاند آنروز دانش را پای برجای نیامده بود امروز سلطان عقل بلند سرپرست و این بهار معنوی و نشاط دایمی از برکات ذات مقدس دادار پرست ایزد شناس جهان آرای زمان ماست سریر آرای اقبال اورنگ نشین معنی مسند نگار دولت روشنی افزای چراغ هدایت بلندی بخش ایوان تکمیل نیر جهانتاب صورت و معنی نور بزم افروز دانش وداد خوانای خطوط ایدی و نواصی دانای نقوش انفسی و آفاقی

شهنشاه نظر سیر و خرد بخش
جهانگیر و جهان دار و جهان بخش
رقم سنج حقیقی و مجازی
جهان عقل اکبر شاه غازی

(b) ای متاع درد در بازار جان انداخته
گوهر هر سود در جیب زیان انداخته
نور حیرت در شب اندیشه اوصاف تو
بس همایون مرغ عقل از آشیان انداخته
از کمان ناجسته در چشم تحیر کرده جا
معرفت کو تیر حکمی بر نشان انداخته
ای بطبع باغ کون از بهر برهان حدوث
طرح رنگ آمیزی از فصل خزان انداخته
سرعت اندیشه را افگنده در دامان تیر
عادت خمیازه در جیب کمان انداخته

در چمنہای محبت ہر قدم چون کربلا
از نسیم عشوہ فرش ارغوان انداختہ
مرغ طبع اندر ہوای معصیت نکشودہ بال
عفو تو شاہین رحمت را بران انداختہ
سایہ پرورد غمت در آفتاب رستخیز
فرش استبرق بزیر سائبان انداختہ

(c) زخود گردیدہ بر بندی چگویم کام جان بینی
ہمان کز اشتیاق دیدنش زادی ہمان بینی
کسی کز ملک معنی در رسد خود را بوی بنمای
کہ گر مس وا نمائی کیمیا را ارمغان بینی
زر ناقص عیارت پیش ازان بر کیمیائی زن
کہ ہم زر ہم محک را شرمسار از امتحان بینی
تو سلطانی غیوری در کمند نفس بد گوہر
بکش زان پیشتر خود را کہ جور از آسمان بینی
ز نفرت شاد شو ہرگہ غمی بر گرد دل گردد
ز غفلت داغ شو ہرگہ کہ خود را شادمان بینی
طرب را پای بر سر زن کہ جنت را خجل یابی
ہوس را دست بر دل نہ کہ دوزخ را تپان بینی
زبان از شکر منعم تا بہ بندی سوی عرفان شو
کہ قدر نعمتش پروانہ عزل زبان بینی
چنان مشتاق خذلانی کہ با صد بند و صد زندان
گریزی در شقاوت گر سعادت را ضمان بینی
خرد در آدمی وانگہ تو شان قد و رخ سنجی
ہما در آشیان وانگہ تو فر آشیان بینی

WEDNESDAY, 27TH NOVEMBER.

[2-30 P. M. TO 5-30 P. M.]

MARATHI—PAPER I.

Pravarasena, Tukaram, Vaman, Moropant, Rajwade and Agarkar.

1. Translate into English :—

पडिआ अ हत्थसिढिलिअणिरोहपण्डरसमूससन्तकवोला ।
पेल्लिअवामपओहरविसमुण्णअदाहिणत्थणी जणअसुआ ॥

मरणम्मि बन्धवाणं जणस्स किं होइ बन्धवो च्चिअ सरणम् ।
तह गुरुसोअक्कवलिआ धरम्मि पडिआ विमुच्छिआ धरणिसुआ ॥

ण कओ बाहविमुक्खो णिव्वण्णेउं पिअ चइअं रामसिरम् ।
णवर पडिवण्णमोहा गअजीविअणीसहा महिम्मि णिसण्णा ॥

खणणिच्चलणीसासं जाअं मोहन्धआरसामच्छाअम् ।
विरलमिलिअच्छिवत्तं मुच्छाहीरन्ततारअं तीअ मुहम् ॥

विसरिअविओअदुक्खं तक्खणब्भट्ठराममरणाआसम् ।
जणअतणआइ णवरं लद्धं मुच्छाणिमीलिअच्छीअ सुहम् ॥

2. (*a*) Write short notes on the author, the title and the special characteristics of the सेतुबन्धम्.

(*b*) Transliterate the following into Sanskrit, giving rules :—

वोच्छिज्जन्तकलअलं जहोइअट्ठाणदरपअत्तावत्तम् ।

खुहिओअहिविच्छूडा ।

झिज्जन्तारुणअम्बा ।

समुद्दवट्टम्मि ।

3. Translate into English :—

(*a*) खरें नानवट निक्षेपींचें जुनें ।
काढिलें ठेवणें समर्थाचें ॥
मजुराच्या हातें मापाचा उकल ।
मी तों येथें फोक सत्ता त्यांची ॥

कुलाळाच्या हातें घटाच्या उत्पत्ती ।
पाठवी त्या जाती पाकस्थळा ॥
तुका ह्मणे जीवन तें नारायणीं ।
प्रभा जाते कीर्णीं प्रकाशाची ॥

(b) चित्त ग्वाही तेथें लौकिकाचें काई ।
स्वहित तें ठायीं आपणापें ॥
मनासि विचार तोच साच भाव ।
व्यापक हा देव अंतर्बाहीं ॥
शुद्ध भावा न लगे सुचावा परिहार ।
उमटे साचार अणिके ठायीं ॥
भोगित्यासि काज अंतरींचें गोड ।
बाहिरल्या चाड नाहीं रंगें ॥
तुका ह्मणे भाव शुद्ध हें कारण ।
भाट नारायण होई त्याचा ॥

4. (a) What particular sects did Tukaram hate? Support your answer by quotations.

(b) What are the special characteristics of a विष्णुदास as described by तुकाराम ?

(c) Write a short commentary in Marathi on :—

अणुरणीयां थोकडा तुका आकाशा एवढा ।
गिळुनि सांडिलें कळिवर भवभ्रमाचा आकार ॥
सांडिली त्रिपुटी दीप उजळला घटीं ।
तुका म्हणे आतां उरलों उपकारापुरता ॥

5. Translate into English :—

(a) न कळत पतिताचें खादलें अन्न ओशीं ।
तर पतित नव्हे तो पापरूपे अहो कीं ॥
म्हणुनि उदरिं तुझ्या देह हा जन्मला गे ।
त्यजिन तरि मला हें पाप तुझें न लागे ॥

(b) हे अग्नितापित-घृतांत तनू तळेना ।
प्रत्यक्ष तो कधिंहि पावक आतळेना ॥
रामापराधिनि सुतास शिवेल कां जी ।
घे ब्राह्मणोत्तम न अंत्यजपात्र-कांजी ॥

(c) वातें जेंवि कसपटें कुरुकटकें दूर उडविलीं पार्थें ।
भुजलीलासंपादितदुर्घटजंभारिमुखनिलिंपार्थें ॥
शाणनिशितमुखबाणप्राणभृदोड्यार्कसूनुच्या अमळा ॥
खंडी नाळापासुनि कमळा मारुत तसा शिरःकमळा ॥

Explain mythological allusions in the above verses.

6. Comment upon :—

(a) कीं मत्स्यादि बिबांश । जीव तितके प्रतिबिंबांश ।
अविद्याउपाधियोगें भ्रंश । बिंबैक्य अनुभवाचा ॥

(b) दों अर्थी म्हणतो हरी । सच्छब्द योजितो ॥

(c) Give a summary of Vaman's discourse upon the three kinds of त्याग.

7. Describe the life and character of कर्ण quoting Moropant wherever you can to support your view.

8. (a) Is विकारविलसित an adaptation or a translation of Shakespear's Hamlet? Support your view by references to the text.

(b) Describe the characters of शालेय and माल्लिका.

9. Write a short note on the moral, material, and social condition of the Marathas during the period covered by the correspondence and the Bakhar you have read.

10. What is your estimate of the literary and the historical value of the Bakhar?

11. Criticise the following remark of Mr. Rajwade :—

मराठ्यांनीं १७६१ पर्यंत जीं जीं कृत्यें केलीं त्या सर्वांत एकच धोरण होतें. महाराष्ट्र धर्म वाढविणें हा मुख्य मुद्दा होता.

12. Compare the styles of the prose works you have read, specially noting the mixture of foreign words, phrases and ideas therein.

13. Account for the fact that most of the Marathi literature up to the middle of the last century happens to be written in verse and treats of either mythological or religious subjects.

N.B.—Out of the last five questions answer any two fully.

EXAMINATION FOR THE DEGREE OF M.A., 1912.

THURSDAY, 28TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

MARATHI—PAPER II.

(Jnânêshwar, Eknâth, Râmdâs, Bhâusâhebâmchî Bakhar, Chiplunkar and Gole.)

1. (*a*) Translate the following into English freely :—

आतां दया ते ऐसी । पूर्णचंद्रिका जैसी ।
निववितां न कडसी । सानें थोर ॥ १ ॥

तैसें दुःखितांचें शिणणें । हिरतां सकणवपणें ।
उत्तमाधम नेणें । विचंचूं गा ॥ २ ॥

पैं जगीं जीवनासारिखें । वस्तु अंगवरी उपखे ।
परि जातें जीवित राखे । तृणाचे ही ॥ ३ ॥

तैसें पुढिलांचेनि तापें । कळवळलीये कृपे ।
सर्वस्वेंसी दिधलें ही आपण पें । न्यूनचि मानी ॥ ४ ॥

निम्न भरलिया उणें । पाणी ढळोंचि नेणें ।
तेवि श्रांता तोषौनि जाणें । सामोरें पां ॥ ५ ॥

पैं पायीं कांटा नेहटे । तंव व्यथा जीवीं उमटे ।
तैसा पोळे संकटें । पुढिलांचेनि ॥ ६ ॥

कां पावो शीतळता लाहे । कीं ते डोळ्याचिलागीं होये
तैसा परसुखें जाये । सुखावत जो ॥ ७ ॥

किंबहुना तृषितालागीं । पाणी आरायिलें असे जगीं ।
तैसें दुःखितांचें सेलभागीं । जिणें जयाचें ॥ ८ ॥

तो पुरुष वीरराया । मूर्तिमंत जाण दया ।
मी उदयजतांचि तया । ऋणिया लाभें ॥ ९ ॥

(*b*) Discuss the readings in the following :—

(1) कां वेदशास्त्रीं अति विश्वासी ।
हें मुख्यत्वें ऐश्वर्य (*v. l.* आस्तिक्य) वैश्यासी ।

(2) मुख्यत्वें ज्यासी ब्राह्मणधर्म (*v. l.* ब्राह्मणजन्म) ।
तोचि बोलिजे द्विजोत्तम ।

(3) ज्याचा न फिटे विषयभ्रम ।
तो संन्यासी नव्हे निष्कर्म ।
त्याचें जाण नित्यकर्म (*v. l.* नित्यजन्म) ।
स्वयें पुरूषोत्तम सांगत ॥

(*c*) Answer any *two* of the following :—

(1) In what sense does Jnânêshwar use the word नागर ?

(2) Trace the development of the ओवीछंद.

(3) Give five instances of the affix उ added to different parts of speech showing the purpose for which it is used.

2. (*a*) Write short grammatical or critical notes on any *eight* of the following :—

(1) नाथिला; (2) स्वप्नऊर्मी; (3) विशाळणें; (4) तें महाभारतप्राकारु; (5) भुवनदिवा; (6) पोटाविद्या; (7) मनोहरें मंदिरें; (8) आम्रवृक्ष मोहरा आले। अवघे उदकाकारितां झाले। (9) संसार हाचि दीर्घ स्वप्न; (10) निरूपणें लागे सोये। सर्वत्रांसी ॥

(*b*) Write short explanatory notes on any *eight* of the following :—

(1) आपद्धर्म; (2) पांथसंगम; (3) ईषणात्रय; (4) करमणूक; (5) दुश्चितपण; (6) गनीम; (7) शिलोंछवृत्ति; (8) सार्ववर्णिक धर्म; (9) आत्महत्यारा.

(*c*) Give the meanings of any *eight* of the following :—

(1) गाथागोवी; (2) सांगणीत्रांगणी; (3) आग्रहार; (4) सायखेडी; (5) समवृत्ति; (6) असिपत्रतरुवर; (7) साधनिका; (8) अभिचार; (9) पाइक; (10) चोहटा; (11) दळवाड; (12) निगुती.

3. Write any *three* of the following :—

(*a*) State the views of Râmdâs on श्रवण, मनन, प्रचीति and संतसमागम and estimate the importance he attaches to these in the building up of spiritual life.

(*b*) How does Râmdâs answer the questions :—

(1) ज्ञानें दृश्य मिथ्या झालें। तरी कां पाहिजे भजन केलें।

(2) सकळांचें अंतःकरण एक। किंवा एक नव्हे अनेक।

(c) Quote passages from Râmdâs in which you notice—
  (1) His intense love for educational propaganda.
  (2) The religious condition of the Deccan.
  (3) References to his personal life.

(d) What illustrations does Eknâth use in describing the सर्वभूतीं एकात्मा of the हंसपरमहंस ?

(e) Give the illustrations by which Jnáneshwar unfolds the meaning of सत्य in the XVIth अध्याय.

4. Explain any *six* of the following with reference to the context :—

(1) वेदु संपन्नु होय ठाईं । परि कृपणु ऐसा आनु नाहीं ।

(2) घड्याचिया आखरा । तळीं बाळ लिहे दातारा ।
का पुढासूनि पाडिकरा । अक्षमू चाले ॥

(3) पैं भांगार जऱ्ही पंधरें । तरी राजावळीचीं अक्षरें ।
लाहे तैंचि सरे । जियापरी ।

(4) तीर्थें बाह्य मळु क्षाळे । कर्में अभ्यंतर उजळे ।
एवं तीर्थें जाण निर्मळें । सत्कर्मेंचि ॥

(5) आणि तोचि हा मी आतां । श्रीव्यासाचीं पदें पाहातां पाहातां ।
आणिला श्रवणपथा । मऱ्हाठिया ॥

(6) ग्रंथकार हे मुदपाकांतील पाकाध्यक्षांसारखे होत.

(7) ऐपत आल्यास शरीरासही घोड्याच्या पायांनीं चढून धावयाचें व पोटाचा अकटोविकट डेरा तयार करावयाचा.

(8) परंतु गरीब दुबळ्या रयतेच्या हृदयांत शिरून उपदेशाचे व सांत्वनाचे शब्द प्रत्येकाच्या घरोघर पोंचवावयाचे हें खऱ्या परोपकाराचें बीज आमच्या सुशिक्षितांस कोठें माहीत आहे.

(9) ज्यास गाढव प्राप्त नव्हतें त्यास हत्ती प्राप्त झाला.

5. (a) Comment on the following couplets so as to bring out the argument fully :—

ह्मणे पार्था तुझा अतिसो । हेंही आह्मी जाणतसों ।
शास्त्राभ्यासाचा आडसो । मानितोसि कीं ॥ १ ॥
नुसधियाचि श्रद्धा । झोंबों पाहसी परमपदा ।
तरी तैसें हें प्रबुद्धा । सोहोपें नोहे ॥ २ ॥
श्रद्धा ह्मणितलियासाठीं । पातेजों नये किरीटी ।
काय द्विज अंत्यजघृष्टीं । अंत्यजु नोहे ॥ ३ ॥

(*b*) Can it be inferred from Eknâth's exposition of अंत्यजप्रकृतिगुणs the character which is independent of वर्ण is the essential part of man's being

6. Give in Marathi your estimate of Raghunâth Rav Dada as soldier;

Or

Narrate briefly in Marathi the campaign of Marwad by Jayaji Sindia.

7. "Râmdâs is plain in his teachings; independent in his criticism c popular beliefs; practical in the treatment of his subject; and fierce in hi attacks on hypocrisy. He lays great stress on the essentials of spiritual lif and preaches that without spiritual knowledge and pure conduct, a] accessories of that life are of no avail." Substantiate the above remark b quotations from or references to your texts. Does the remark hold goo also of the writings of Eknâth and Jnâneshwar ?

8. To which form of literary production do the writings of Chiplunkar an Gole belong? It is said that "the style is the man" and the manner; show ho this dictum applies to these writers.

Or

What in Chiplunkar's opinion, are the canons of literary criticism and ho far does he himself conform to them in his own writings?

Or

Characterize the tone of the writings of Gole and Chiplunkar.

9. State fully Gole's views on (1) female education and (2) woman's participa tion in full social life; and discuss them in the light of the advance whic these questions have since made.

Or

"However well a translator may render the ideas of a poem, he cannot give th original words of it in another language. Now the poet's very own words hav a beauty and harmony and appropriateness which a translator cannot reproduc The ideas remain, but the essence of the poem is lost: gone is the vigour; th humour is weakened; and the harmony is impaired."

Discuss the truth of this remark by Andrew Lang and show how Chiplunka illustrates it.

10. What, in your opinion, constitutes the soul of literary art? and from th standard judge the authors you have studied.

Or

While speaking of the principal features of the great religious movemen which stirred Mahârâshtra for over 500 years, from the beginning of the 12t to the end of the 18th century, Mr. Justice Ranade observes that it "can t traced as a steady growth in spiritual virtues", and that it "has left its mar upon the country and the people indelibly." Examine this position in the ligh of the literature you have studied.

Or

Laurie Magnus observes:—

"A nation's literature is an organism, subject, like all the rest, to laws c heredity and evolution. Each age is a phase of development. Natural instinc compel it to throw off as violently as it can the slough of the preceding age. Discuss the truth of this observation with regard to the growth of Marat iterature, basing your remarks upon the authors you have read.

N.B.—Of the first six questions candidates may answer any *five* and of the last four (7 to 10), any *three*.

FRIDAY, 29TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

MARATHI—PAPER III.

(Translation and Composition.)

1. Translate into Marathi :—

Let there be many windows to your soul,
That all the glory of the universe
May beautify it. Not the narrow pane
Of one poor creed can catch the radiant rays
That shine from countless sources Tear away
The blinds of superstition ; let the light
Pour through fair windows broad as Truth itself
And high as God.
Why should the spirit peer
Through some priest-curtained orifice and grope
Along dim corridors of doubt, when all
The splendour from unfathomed seas of space
Might bathe it with the golden waves of Love?
Sweep up the debris of decaying faiths ;
Sweep down the cobwebs of worn-out beliefs,
And throw your soul wide open to the light
Of Reason and of knowledge. Tune your ear
To all the wordless music of the stars
And to the voice of Nature, and your heart
Shall turn to truth and goodness, as the plant
Turns to the sun. A thousand unseen hands
Reach down to help you to their peace-crowned heights,
And all the forces of the firmament
Shall fortify your strength. Be not afraid
To thrust aside half-truths and grasp the whole.

2. Translate freely into Marathi :—

"In thus maintaining that the individual is the end of social institutions, I may be thought to discourage public efforts and the sacrifice of private interest to the state. Far from it. No man, I affirm, will serve his fellow-beings so effectually, so fervently, as he who is not their slave; as he who, casting off every other yoke, subjects himself to the law of duty in his own mind. For this law enjoins a disinterested and generous spirit as man's glory and likeness to his Maker. Individuality, or moral self-subsistence, is the surest foundation of an all-comprehending love. No man so multiplies his bonds with the community as he who watches most jealously over his own perfection. There is a beautiful harmony between the good of the state and the moral freedom and dignity of the individual. Were it not so, were these interests in any case discordant, were an individual ever called to serve his country by acts debasing his own mind, he ought not to waver a moment as to the good which he should prefer. Property, life, he should joyfully surrender to the state. But his soul he must never stain or enslave. From poverty, pain, the rack, the gibbet, he should not recoil; but for no good of others ought he to part with self-control or violate the inward law. We speak of the patriot as sacrificing himself to the public weal. Do we mean that he sacrifices what is most properly himself, the principle of piety and virtue? Do we not feel that however great may be the good which through his sufferings accrues to the state, a greater and purer glory redounds to himself, and that the most precious fruit of his disinterested services is the strength of resolution and philanthropy, which is accumulated in his own soul?

I have thus endeavoured to illustrate and support the doctrine that spiritual freedom, or force and elevation of soul, is the great good to which civil freedom is subordinate, and which all social institutions should propose as their supreme d."

3. Write an essay in Marathi on—

"The parish is the cradle of the nation."

Or

"The responsibilities of literary writers."

MONDAY, 25TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HISTORY—PAPER I.

(*English History from 1757 to 1783.*)

N.B.—Only five questions are to be attempted.

1. Characterize the Elder Pitt as war minister.

2 What was the importance of the relation between Prussia and England during the Seven Years' War for either country?

3. Explain the unpopularity of the Peace of Paris. What means were employed to secure its ratification by Parliament?

4. To what do you ascribe the success of the "Letters of Junius"?

5. Compare the views on Parliamentary Reform of the Radical Party, of Chatham and of Burke.

6. Review the proceedings of the Congress at Philadelphia in 1774. What reasons are there to believe that their disclaimer of all wish for separation was sincere?

7. What difficulties beset Washington in 1776 and 1777, and what light do they throw on the nature of the American Revolution?

8. How far is America indebted to France for the successful issue of the War of Independence?

9 Explain the circumstances leading to the Coalition Ministry under Portland. Compare it with the Coalition of 1757.

10. Trace the growth of the agitation leading to the concession of legislative independence to Ireland. Explain the attitude of Ulster.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY—PAPER II.

The Constitutional History of England.

N.B.—Only *five* questions are to be attempted.

1. Discuss the constitution and powers of the Witanagemot and trace its connection with the later Commune Concilium or Great Council of the nation and show how the latter was transformed into the House of Lords.

2. "William the Conqueror desired to reign both as feudal lord and national king." Illustrate this statement.

ate changes which the Conquest introduced were but they were practical rather than formal." Can ement ?

ual development of the idea of parliamentary represen-

s were made by the House of Commons during the orkist periods to secure (1) Freedom of speech; rest ?

time of the Revolution was the legal position of the nse with acts of parliament ? And how was it dealt on and Bill of Rights respectively ?

ieaning of the suspension of the Habeas Corpus Act ? need for the Act.

ie contributions of William Pitt and Sir Robert Peel evelopment of the Fiscal System of the country ?

rigin and development of the party system of govern- he development of groups such as the Labour Party

ponsible government" in a colony ? How does it come

TUESDAY, 26TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

HISTORY—PAPER III.

conomic History and Political Economy.

B.—Only five questions are to be attempted.

oncept of Final Utility and its relation to price.

it, and what are the advantages and the drawbacks of ystem ?

ifficulties besetting the Indian Currency Question.

drawbacks of the modern wages system ? Examine of the principal remedies proposed.

must be taken into consideration when investigating the f a country ?

industrial organization of England during the Saxon

oollen Trade and Manufactures of England during the

actory Legislation in England, and explain how and tory Legislation differs from it.

ie views of the Mercantilists and of Adam Smith on the recious metals ? What light does the policy of modern ie action of modern banks throw on them ?

y the Industrial Revolution entailed a complete conditions wherever it spread.

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY—PAPER IV.

History of India (1757—1858).

N.B.—Only *five* questions are to be attempted.

1. Give a critical account of the trial of Nuncomar.

2. Discuss the merits and demerits of the Permanent Settlement.

3. How far can the Marquis Wellesley be said to have founded the British Empire *of* India?

4. Give an account of the Subsidiary System and trace the history of its development.

5. Trace the career of Tippu Sultan of Mysore and form an estimate of his character.

6. Show how a policy of non-intervention naturally led to annexation.

7. Give a critical account of the chief reforms of Lord William Bentinck.

8. Sketch the Indian career of the first Lord Hardinge.

9. Discuss the chief causes which led to the Indian Mutiny.

10. "Delhi is the Empress of Indian cities. She has often been sacked and left naked and desolate. But she could not be despoiled of the incomparable situation which marks her for the metropolis of a great Empire." Discuss this statement in the light of recent events.

WEDNESDAY, 27TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HISTORY—PAPER V.

European History from 1272 to 1494.

N.B.—Only five questions are to be attempted.

1. Review the domestic policy of Philip IV of France.

2. Describe the constitutional movement in France in the middle of the fourteenth century.

3. Lodge says of Charles IV, King of Bohemia and Emperor of Germany, that he is incontestably the greatest ruler whom Europe produced in the fourteenth century. How far is this opinion justified?

4. Describe the great struggle for supremacy between Genoa and Venice during the fourteenth century and its consequences for Venice.

5. What were the questions before the Council of Constance, and what was their solution?

6. Describe the character and methods of Cosimo di'Medici's rule.

7. Explain the cause of the Swiss War of Charles the Bold of Burgundy and its consequences for France.

8. Trace the history of the Teutonic Order from its origin to the zenith of its power under Winzig of Kniprode.

9. Compare the Constitutions of Castile and of Aragon. What effect had the union of these countries on their respective constitutions?

10. Characterize the Revival of Letters in Italy.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HISTORY—PAPER VI.

Comparative Politics.

N.B.—Only *five* questions are to be attempted.

1. What is meant by the patriarchal theory of the origin of nations? By what arguments has it been supported and impugned?

2. Describe the characteristics of what is called Heroic Kingdoms.

3. Discuss the causes which in primitive times led to change and with it to progress.

4. Discuss Aristotle's Analysis of the Forms of Government and his cycle of changes from one to the other.

5. What were the functions of the Roman Senate under the later republic? How do you account for the power which it exercised?

6. Compare the guiding principles of the earlier Roman Imperial administration with those of the British in India.

7. Compare in respect of their constitution and mode of appointment and powers, the German Federal Council and the American Senate.

8. "The executive power in every government is altogether subordinate to the legislature." (*Hume.*)

Test the correctness of the dictum by examining the relations of legislature and executive in the U. S. of America and Switzerland.

9. Compare and discuss the adequacy of the existing checks on Constitutional Amendments in France, Germany, U. S. A. and Great Britain.

10. What is meant by democratic Government? Would you call the Governments of England, France and the U. S. A. democratic and why?

MONDAY, 25TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER I.

History of Ancient Philosophy.

N.B.—Not more than six questions to be answered.

1. "In a certain sense it may be said that Stoicism was a Semitic (Oriental) Philosophy." Estimate the truth of this statement.

2. "Heraclitus says somewhere that all things flow and nothing abides; and likening existing things to the flow of a river, he says that one cannot go down twice into the same river." Explain what Heraclitus meant by change and compare his doctrine with any modern one that lays emphasis on this idea.

3. Tell what you know of Parmenides and his teaching.

4. Give an outline of the history of the idea of Teleology in ancient philosophy.

5. Explain fully Plato's idea of God and His relation to the world.

6. Give in outline the ideas of the ancient Greeks regarding the connexion of Appearance and Reality.

7. What explanation can you give of Aristotle's influence on the mediæval western world? How far do you think that influence rational and beneficial?

8. Indicate briefly the chief elements in the Ethics of Plato that are of permanent value and those that are not. Give reasons for your answer.

9. Give a sketch of Eclecticism or Syncretism in the Græco-Roman world.

10. Estimate the place and importance of Plotinus in Greek philosophy.

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER II.

(Modern Philosophy.)

N.B.—Not more than *six* questions to be solved.

1. Describe fully the inductive method outlined in Bacon's Novum Organum; point out the *real* advance it made upon the scholastic method as also the *essential* defect it had as compared with the modern scientific method.

2. What is the *precise* meaning and purpose of Descartes' method of doubt? How far did he succeed in arriving, by that method, at *certain* truths not involving *presuppositions*?

3. Compare and contrast the problem of knowledge and the solution of it as given by Locke and Kant.

4. "The logical presuppositions of Spinoza's philosophy lie in the fundamental ideas of Descartes, which Spinoza accentuates, transforms and adopts."

Bring out the truth of the above by a brief account of the fundamental ideas of Spinoza's philosophy.

5. Give the argument of Berkeley's "new theory of vision"; and point out its importance in the development of his thought.

6. In what *precise* sense may Hume be regarded as a sceptic and how was Kant roused from his dogmatic slumber by this scepticism?

7. Set out fully Leibnitz's principles of continuity and of pre-established harmony and point out the use he makes of these in his system.

8. Distinguish clearly the psychological and epistemological elements in Kant's transcendental deduction of the categories. What is the importance of this deduction in the critical philosophy?

9. "Hegel's philosophy is the logical outcome of that of Kant."

Justify the above by a brief account of the origin and purpose of Hegel's philosophy.

10. What is Spencer's method of reconciling religion and science and how far does it appear satisfactory to you?

WEDNESDAY, 27TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER III.

(a) *Plato.*

N.B.—Only *six* questions to be attempted.

1. "Knowledge is true opinion." How does Plato criticise this definition and what psychological truths are brought out in this criticism?

2. On what grounds does Plato maintain the immortality of the soul and how far do they carry conviction to modern minds?

3. Expound Plato's classification of pleasures and point out the place Plato assigns to pleasures in the scale of the good things of life.

4. How does Plato distinguish between the lower and the higher love and how does he show that through the latter a man reaches the highest goal of life?

5. What, according to Plato, is the true aim and function of Rhetoric and on what grounds does he establish the superiority of the "spoken over the written word"?

6. "Plato's ideal theory was an attempt to reconcile the conflicting views of the previous philosophers concerning knowledge and reality."

Justify the truth of the above by a brief statement of the origin and real import of Plato's doctrine of ideas.

7. Briefly delineate Plato's ideal republic and consider how far he anticipated many of the modern problems of statecraft.

8. Describe in detail Plato's myth of the Cave and bring out its full philosophic import and significance.

9. Bring together Plato's ideas on the subject of the classification of the sciences as found in the *Philebus* and the *Republic* and show what use he makes of it in the scheme of education designed for the rulers of the ideal republic.

10. How and why does Plato object to the introduction of art into his ideal state and how far is his view tenable in modern times?

WEDNESDAY, 27TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER III.

(b) *Aristotle.*

4. Expound Aristotle's idea of Justice, showing specially its relation to Friendship.

5. Explain clearly the influence of Aristotle's Psychology on his Ethics.

6. What, according to Aristotle, is the relation between Ethics and Politics? If he had to choose between being a politician and a philosopher, to which side would his inclination go, and why?

7. "In what sense are we to speak of parts of the soul, and how many are there of them?" How does Aristotle answer this question of his own?

8. What does Aristotle mean when he says that we have a "common sense for the perception of common qualities"? Is there any truth in this statement?

9. Expound Aristotle's teaching on Democracy, showing how far his ideas apply to the conditions of modern States.

10. What, according to Aristotle, are the characteristics of the ideal State? How far are they suitable as criteria of modern theories of the State?

WEDNESDAY, 27TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER III.

(d) *Kant.*

N.B.—Not more than *six* questions to be answered.

1. Explain what Kant means by the Causality of Freedom and distinguish it from the Causality of ordinary Naturalism.

2. Explain precisely what Kant means by the "Transcendental Unity of Apperception", and show the central place of this idea in his *Critique of Pure Reason.*

3. How far in your opinion was the Ethical system of Kant influenced by the circumstances of his early home training?

4. How far was Kant indebted to his philosopher precursors?

5. What precisely was the problem which Kant set himself to solve in the *Critique of Pure Reason*?

6. Examine Kant's doctrine that the Good Will is the only thing properly to be called good.

7. Expound Kant's doctrine of penal justice and compare it with recent ideas on punishment.

8. Explain clearly the genesis of the Categorical Imperative and examine its practical worth.

9. Give an account of Kant's treatment of the idea of Design in Nature.

10. Examine Kant's view of the relation between Christianity and Natural Religion.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHILOSOPHY—PAPER IV.

(a) *Moral Philosophy.*

1. Compare and criticise the classification of Ethical systems as given by Sidgwick and Martineau and determine, in their respective schemes, the place of Kant and Green as Ethical writers.

2. Set forth the result of Sidgwick's review of Common Sense Morality, pointing out the principles by which it is arrived at.

3. What, according to Sidgwick, is the ultimate good of life? To what objections does his view lie open?

4. "Between the action of the self-conscious soul in desiring and its action in learning to know there is a real unity."

Bring out the truth of the above by a clear exposition of Green's analysis of desire and intellect.

5. Explain fully and clearly Green's view of the moral ideal and of the use of such an ideal in practical life.

6. What account does Martineau give of Spinoza's ethical theory and how far does he consider this theory consistent with Spinoza's philosophy?

7. Give Hutcheson's analysis of æsthetic and moral sense and show with what justice Martineau calls Hutcheson's ethical theory æsthetic.

8. Distinguish clearly the different forms of Kant's formula of the moral law and show how far these forms imply a development and an improvement in Kant's thought.

9. How does Kant, in his Ethics, prove the immortality of the soul and the existence of God? To what criticism is this argument open?

10. Bring together, from the ethical writers you have read, the different views on the subject of the freedom of the will. Give the view you prefer with the grounds for your preference.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHILOSOPHY—PAPER IV.

(b) *Natural Theology.*

N.B.—Not more than *six* questions to be answered.

1. Explain any attempt that you have read to maintain the Divine Sovereignty along with Human Freedom. Are those ideas compatible?

2. Can the terms God and the Absolute be used synonymously? Give full reasons for your answer.

3. Explain clearly the essential philosophic position involved in a doctrine of true Creation.

4. How far is the idea of Pre-existence involved in that of Immortality? Justify your answer.

5. How does the theory of Evolution affect our idea of God and of Creation?

6. Consider how far *worth* and *goodness* are marks of the Absolute.

7. State the problems that arise from the presence of evil in the world, and indicate the lines on which you would proceed to solve the problems.

8. Discuss the question of the influence of a people's Theology on their character.

9. How far do you consider the Agnostic position tenable? Give full reasons for your answer.

10. State any one of the arguments for the existence of God and estimate its validity.

THURSDAY, 28TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER V.

(a) *Psychology—James and Sully.*

N.B.—Not more than six questions to be answered.

1. Describe carefully the method of Psychology and point out any special errors to which this method is open.

2. Define Sensation, Perception, Cognition; and describe the mental process involved in Memory of an external object, *e.g.*, a tree.

3. What is meant by Association of Ideas? How far, in your opinion, does this correctly describe mental processes?

4. State the Weber-Fechner law of the relation of Sensation to Stimulus, and examine its truth.

5. Describe fully the mental processes involved in Attention.

6. Enumerate the factors that play the chief part in the development of the individual self.

7. Examine the validity of the theory of a sub-conscious self.

8. Describe clearly the place and function of Pleasure-pain in mental processes.

9. Define Instinct and show its relation to Habit.

10. Set forth shortly and clearly the intellectual contrast between Brute and Man.

THURSDAY, 28TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHILOSOPHY—PAPER V.

(b) *Psychology, Rational and Empirical.*

N.B.—Only *six* questions to be solved.

1. How far are attempts to write 'psychology without metaphysics' successful? Explain Ladd's view on the question.

2. Discuss the different views regarding the classification of mental faculties and point out with reasons the view which seems to you satisfactory.

3. Set out clearly the true nature of the reality of mind and give the grounds on which Ladd attributes such a reality to mind.

4. "To be always sensible of one and the same thing is the same as not to feel at all."

Expound the psychological theory involved in the above quotation and disengage the truth and error in it.

5. Explain clearly the origin, growth and nature of voluntary action.

6. Distinguish clearly between Belief and Knowledge and point out the conditions which produce Belief.

7. Why is the doctrine of *universals* introduced into psychology? Expound clearly the different theories on the subject and discuss their respective merits or defects.

8. What are the *psychological* grounds on which Freedom of the Will is maintained and what psychological objections have been brought against it? Give your opinion on the question.

9. Compare and criticise Kant's and James' theories of the soul.

10. Point out the different theories regarding the connection between the body and the mind and fully expound the theory which appears to you to be the true one.

THURSDAY, 28TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHILOSOPHY—PAPER VI.

Essay.

Trace historically the meanings of Science and Philosophy. Expound the present position regarding their provinces and their mutual relations.

Or

Disentangle the *epistemological* ideas to be found in the writings of modern philosophers Outline the view you prefer with the grounds on which it is based.

Or

Contrast fully the Greek and the modern Moral Ideals, giving illustrations.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

STATICS, DYNAMICS OF A PARTICLE AND ELEMENTARY RIGID DYNAMICS.

N.B.—About two-thirds of the paper will carry full marks.

1. Reduce a force P in the line $\frac{x-a}{l} = \frac{y-b}{m} = \frac{z-c}{n}$ into component forces and couples, the lines of action of the former and the axes of the latter being the axes of coordinates.

Show that a force X, Y, Z in any one of one system the hyperboloid $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$ on being thus couples respectively equal to $\frac{bc}{a} X$, $\frac{ca}{b} Y$, $\frac{-ab}{c} Z$.

2. Find the form of a funicular polygon and show ho tensions by a graphical construction.

If the polygon be made by $2n + 1$ equal particles each $2n + 2$ weightless strings each of length l, and if the spa equal to $2a$, then the horizontal tension T is given by th

$$\frac{a}{l} = \sum_{m=0}^{m=n} \left[1 + (m + \tfrac{1}{2})^2 \frac{W^2}{T^2} \right]^{-}$$

3. Work out graphically the following problem formulæ for the final calculation of geometrical lengths uniform rods are freely jointed at their extremities and over two smooth pegs in a horizontal line at a distance the length of one rod. If the lowest side be horizontal action at the upper joint is $\frac{5}{1}\sqrt{3}\;W$ and at each of t where W is the aggregate weight of the rods.

4. Obtain expressions for the coordinates of the cen arc of a curve; apply these to find the C. G. of the arc two cusps.

If the density of a parabolic wire at any point be in to the perpendicular from the focus on the tangent at t the C. G. of any arc is at the same distance from the ax of the tangents at the extremities of the arc.

5. Explain Hooke's law about the tension of elas the potential energy of a stretched string.

A heavy uniform rod whose length is $2a$ is suspe strings of equal unstretched lengths, a weight W is at a point distant b from one extremity, prove that if θ b makes with the horizontal $\sin \theta = \frac{W}{2W'} \left(1 - \frac{b}{a}\right)$ wh necessary to increase the length of one of the strings

6. If w be the line mass in a gravitation caten constant, ρ being the radius of curvature at the tangent makes an angle ϕ with the horizon.

A cylinder is constructed so that its normal section catenary, the lowest point of the latter being no cylinder; if now the cylinder be uniformly roug string be laid on the corresponding portion of the cy will be in limiting equilibrium if $e^{\mu\alpha} \cos \alpha = e^{\mu\beta}$, the inclination of the tangents at the ends to the ho

7. Establish the equation $\Delta^2 V + 4\pi\rho = 0$ in the

The ends of a homogeneous solid circular cylin its axis and seen from its centre of gravity a semivertical angle $\frac{\pi}{3}$, show that if V be the poten the centre of gravity and V_0 the potential at that p

$$V = V_0 - \tfrac{1}{3}\pi\rho\,(x^2 + y^2 +$$

8. Investigate the values of the accelerations of a particle along and perpendicular to the radius vector, in polar coordinates.

A particle, under the action of a constant force from a centre, is projected, perpendicularly to the radius vector, at a distance c from the centre, with the velocity acquired in falling that distance from the centre. Prove that the path is given by $\left(\frac{c}{r}\right)^3 = \cos^2 \frac{3}{2}\theta$; and that the particle will ultimately move in a straight line passing through the origin, in the same manner as if its path had always been this line.

9. A heavy uniform chain is coiled at the edge of a smooth table and one end slips over; prove it will in time t descend through a space $\frac{1}{6}gt^2$.

If a weight equal to a length l of the chain had been fastened to the end of the coil, and projected vertically upwards with a velocity due to a height h, it would have ascended through a height $\sqrt[3]{l^2(l + 3h)} - l$.

10. Integrate the differential equation of planetary motion and show how to find the constants of the orbit from the initial conditions.

A body is describing an ellipse of eccentricity $\sqrt{\frac{7}{8}}$ under a force to the focus S; when the particle is at one end B of the minor axis, the centre of force is suddenly transferred to a point S' in BS produced such that $BS' = 4BS$, and the absolute force is doubled and becomes repulsive; prove that the new orbit is a rectangular hyperbola.

11. Define the hodograph of an orbit and prove that the velocity in the hodograph is the measure of the acceleration in the original orbit.

Find the hodograph of an elliptic orbit described under the action of a force to the focus, and thence prove that the mean value taken with regard to time of the inverse square of the radius vector is equal to the product of the reciprocals of the semi-axes.

12. Work out the problem of the brachistochrone under gravity and of the brachistone under a central repulsive force varying as the distance.

13. Explain the terms *moment of inertia* and *momental ellipse*, and show that the momental ellipse at the centre of a uniform lamina in the form of a parallelogram may be taken to be the ellipse that touches the sides at their middle points and that if r be any central radius of this ellipse the moment of inertia about it is $M\Delta^2/12r^2$ where Δ is the area of the lamina.

14. Prove the principle of the conservation of angular momentum.

If an octant of an ellipsoid bounded by three principal planes be rotating about the axis a with angular velocity ω, and if this axis suddenly become free and the axis b fixed, show that the angular velocity is

$$\frac{2ab\omega}{\pi(a^2 + c^2)}.$$

15. Find the equations of motion of a rigid body in one plane.

A rod of length $2a$ is held in a position inclined at an angle α to the vertical, and then let fall on to a smooth inelastic plane. Prove that the end of the rod which strikes the plane will leave it immediately after the impact if the height through which the rod descends before impact is greater than $\frac{a(1 + 3\sin^6\alpha)^2}{18\cos\alpha\sin^2\alpha}$. Also find an equation to determine the inclination of the rod to the vertical when an end next strikes the plane.

16. Investigate in their simplest form the eq
of a body set in motion in one plane.

A circular disc of mass M, radius a, and mon
centre Mk^2, is spinning with angular velocity
with any velocity on a rough rod, mass m, re
Show that the angular velocity immediatel
reduced to

$$\frac{(M + m)\, k^2}{ma^2 + (M + m)\, k^2}$$

17. Four equal uniform rods are jointed toge
$ABCD$, and the system is suspended from the
being maintained by an elastic string joining A
of the string, and, the modulus of elasticity bei
of the rods, prove that, if C be slightly d
simple isochronous pendulum will be $\frac{5}{12}$ AC. I
the string be cut, prove that the initial pressure
of the weight of one of the rods, and that th
is equal to $\frac{6}{5}\, g$.

18. Obtain Lagrange's generalised equation

A tube of mass M in the form of a circle of
horizontal table. An elastic string whose n
is fastened at one extremity to a point A of th
particle of mass m; the string lies along
stretched until m coincides with A; if the tube

free show that the string will slacken in a ti

λ being the modulus of elasticity.

TUESDAY, 26TH NOV
[2-30 P.M. TO 5-30

ANALYTICAL GEO

N.B.—Candidates are not expected to

1. Find the equation of the pair of tangent
conic given by the general equation of the seco

Prove that the tangents at the points where
ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ are given by $\Big(\frac{x^2}{a^2} + \frac{y}{b^2}$
$= (lx + my + n)^2$.

2. If the axes are oblique show that the g
rectangular hyperbola if $a + b - 2h \cos w = 0$

The directrix of the parabola $y^2 = 4ax$, the
$x + y \cos \omega + a =$

3. Find the foci of the general conic referr

Find the foci of $5x^2 + 4xy + 2y^2 - 2x$
equation being $4l^2 + 19m^2 + 6n^2 - 20lm + 1$

4. If two conics have double contact with each other, then the polar of the centre of one with respect to the other is parallel to the chord of contact.

5. Find the centre of a conic given in areal (or trilinear) coordinates.

The locus of the centres of all conics touching $lx + my + nz = 0$ and circumscribing the triangle of reference is $\sqrt{lx(y + z - x)} + \sqrt{my(x - y + z)} + \sqrt{nz(x + y - z)} = 0$ (Areals). Prove this and deduce that the axes of the four parabolas included among these conics are parallel to $x\sqrt{l} \pm y\sqrt{m} \pm z\sqrt{n} = 0$.

6. Find the condition that $lx + my + nz = 0$ may touch the conic $\sqrt{\lambda x} + \sqrt{\mu y} + \sqrt{\nu z} = 0$.

Find the equations of the circles inscribed and escribed to a triangle.

7. Find the envelope of a straight line cutting two conics in a harmonic range and show that its point equation is $\Theta' S + \Theta S' - F = 0$.

8. Find the condition that two straight lines may intersect.

All straight lines which intersect the two straight lines

$$\frac{x}{\cos \alpha} = \frac{y}{\pm \sin \alpha} = \frac{z \mp c}{0}$$

and make equal angles with them are generators of one or other of the hyperbolic paraboloids $yz = cx \tan \alpha$, $xz = cy \tan \alpha$.

9. Prove that the determinant formed by the nine direction cosines of three mutually perpendicular straight lines is ± 1.

Show that the volume of a tetrahedron in terms of three coterminous edges and the angles between them is

$$abc \left\{1 + 2 \cos \lambda \cos \mu \cos \nu - \cos^2 \lambda - \cos^2 \mu - \cos^2 \nu\right\}^{\frac{1}{2}}.$$

10. Find the condition that the plane $lx + my + nz = p$ may touch the conicoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$. Deduce the equation of the director sphere.

Find the equations of the two tangent planes to $\frac{x^2}{3} - 4y^2 + \frac{z^2}{2} = 1$ that pass through the straight line $2x - 6y - z = 0$, $x - 2y - 2z + 1 = 0$.

11. Find the locus of the middle points of a system of parallel chords of the conicoid given by the general equation of the second degree.

Prove that the equations of the direction cosines of the axes are obtained by solving a cubic equation all of whose roots are real.

Show that the conicoid

$$3x^2 + 3y^2 + 2z^2 + 4xy - 2xz + 2yz + 2x - 2y - 4z + 1 = 0$$

has a line of centres $x + 1 = 1 - y = z$ and that when transferred to its principal axes it becomes $5x^2 + 3y^2 = 1$.

12. Find the magnitudes of the principal axis of a section of a central conicoid by a plane through the centre.

If $lx + my + nz = 0$ is the given plane and $ax^2 + by^2 + cz^2 = 1$ the given conicoid show that the axes of the section are the lines in which the given plane cuts the cone $(b - c)\, lyz + (c - a)\, mzx + (a - b)\, nxy = 0$.

13. Find the equations of the generators of the hyperboloid $\frac{x^2}{a^2} + \frac{y^2}{b^2} - \frac{z^2}{c^2} = 1$ that pass through the point $(a \cos \alpha, b \sin \alpha, 0)$.

Deduce that for the generators through $(a \cos \theta \sec \phi, b \sin \theta \sec \phi, c \tan \phi)$ $\theta + \phi$ or $\theta - \phi$ is constant.

14. Obtain expressions for the radii of curvature and torsion of a curve in space in terms of the differential co-efficients of the rectangular coordinates with respect to the arc.

In the curve $x = e^t \cos t$, $y = e^t \sin t$, $z = e^t$, prove that

$$\rho : \sigma = 1 : \sqrt{2}.$$

15. Find the equation giving the principal radii of curvature at any point of the surface $z = f(xy)$.

Find the conditions that the point may be an umbilic.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

DIFFERENTIAL AND INTEGRAL CALCULUS.

N.B.—Candidates are not expected to answer the whole paper.

1. Transform $\frac{\partial^2 u}{\partial x^2} + \frac{\partial u^2}{\partial y^2}$ to polar coordinates.

Show that $\frac{\partial^2 u}{\partial x^2} \cdot \frac{\partial u^2}{\partial y^2} - \left(\frac{\partial^2 u}{\partial x \partial y}\right)^2$ when transformed to polar coordinates becomes $\frac{\partial^2 u}{\partial r^2} \left(\frac{1}{r} \frac{\partial u}{\partial r} + \frac{1}{r^2} \frac{\partial^2 u}{\partial \theta^2}\right) - \left\{\frac{\partial}{\partial r}\left(\frac{1}{r} \frac{\partial u}{\partial \theta}\right)\right\}^2$.

2. Trace the curve $x^4 = ay^3 - axy^2$ and show that the area of its loop is $\frac{1}{210} a^2$.

3. If $R(x, y) = 0$ be the result of eliminating a between $f(x, y, a) = 0$ and $\frac{\partial f}{\partial a} = 0$, show that the tangent at any point (x, y) on $R(xy)$ coincides with the tangent at the same point to that curve of the family $f(x, y, a) = 0$ that passes through the point, except when (x, y) is a singular point on $f(x, y, a) = 0$.

Show that the envelope of the system of circles whose centres lie on the rectangular hyperbola $x^2 - y^2 = a^2$ and which pass through the centre of the hyperbola is the lemniscate $r^2 = 4a^2 \cos 2\theta$.

4. Prove that the points of inflexion of an algebraical curve $f = 0$ are given by equating to zero the Hessian of the function f, rendered homogeneous.

Show that the tangents at the point of inflexion of the curve

$$y^2(x + a) = x^2(x - a) \text{ are } 5x \pm 3\sqrt{3}\,y - 4a = 0.$$

5. Find the radius of curvature of a curve $y = f(x)$.

If the circle of curvature has contact of the third order with the curve, prove that at the point of contact we must have

$$\left\{1 + \left(\frac{dy}{dx}\right)^2\right\} \frac{d^3y}{dx^3} = 3 \frac{dy}{dx} \left(\frac{d^2y}{dx^2}\right)^2.$$

What is the geometrical meaning of this condition?

6. Prove Lagrange's theorem that if $y = z + x\,\phi(y)$, then

$$f(y) = \Sigma\,\frac{x^n}{n!}\,\frac{d^{n-1}}{dz^{n-1}}\ \left\{f'(z)\cdot\left[\phi(z)\right]^n\right\}.$$

If $y = e^{xy}$ prove that $y = \sum_0^{\infty} (n+1)^{n-1}\frac{x^n}{n!}$ provided $x < e^{-1}$.

7. Prove that for $m > n$, $\int_0^1 x^m (\log x)^n\,dx = \frac{(-)^n\,n!}{(m+1)^{n+1}}$, and hence obtain

$$\int_0^1 x^x\,dx = 1 - \frac{1}{2^2} + \frac{1}{3^3} - \frac{1}{4^4} + \ldots\ldots\ldots$$

Show that—

$$\int_0^1\int_0^1 (xy)^{xy}\,dx\,dy = -\int_0^1 x^x \log x\,dx = \int_0^1 x^x\,dx.$$

8. Define the functions $\Gamma(m)$, $B(m, n)$ and find the relation connecting those functions.

Deduce or otherwise prove $\Gamma(a)\ \Gamma(1-a) = \pi \operatorname{cosec} a\pi$.

Prove that $\int_0^1 \log \Gamma(x)\,dx = \log\sqrt{2\pi}$.

9. APB is a semicircle, AB being the diameter: at any point P on the circumference PQ is drawn perpendicular to the plane of the semicircle and equal to PB, show that the locus of Q is Viviani's curve, the intersection of a sphere and a cylinder which has for base a circle described on a radius of the sphere as diameter.

Show that the whole length of Vivian's curve is equal to the perimeter of an ellipse whose semiaxes are $\sqrt{2a}$, a where a is the radius of the sphere.

10. Prove Holditch's theorem in the form:

If a straight line carrying three tracing points A, B, C move in any manner in a plane returning to its original position after making a complete revolution and if (A), (B), (C) represent the areas of the closed curves described by the three points, then

$$BC(A) + CA(B) + AB\ C + \pi BC.\ CA\ .\ AB = 0.$$

P is any point on a closed oval curve and a straight line PQ of constant length a makes a constant angle α with the tangent at P. Show that the area of the locus of Q exceeds the area of the closed oval by

$$\pi a^2 + \pi\,a\,.\,s\,.\,\sin\alpha,$$

where s is the length of the given oval.

11. Calculate $\iiint x^2\,dx\,dy\,dz$ taken throughout the interior of the ellipsoid $\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1$. Deduce the moments of inertia about the principal axis.

12. By the substitution $x + y + z = u$, $y + z = uv$, $z = uvw$ or othe wise reduce the $\int\int\int f(x + y + z)\, x^{l-1}\, y^{m-1}\, z^{n-1}\, dx\, dy\, dz$ take over all positive values of x, y, z such that $x + y + z < a$ to a singl integral.

Similarly prove that $\int\int\int \ldots\ldots dx_1\, dx_2 \ldots dx_n$ taken over all value of the variables such that

$$x_1{}^2 + x_2{}^2 + \cdots + x^2 < 1$$

is equal to $\pi^{\frac{n}{2}} \div \Gamma\left(\frac{n}{2} + 1\right)$.

13. Prove that to make $\int_{x_0}^{x_1} f(x, y, y')\, dx$ stationary, y must satisfy th equation $\frac{\partial f}{\partial y} - \frac{d}{dx}\left(\frac{\partial f}{\partial y'}\right) = 0$.

Show also how to make the above integral stationary for all values of y that satisfy $\int_{x_0}^{x_1} \phi\,(x, y, y')\, dx =$ constant.

14. Show that of all curves of given length in a vertical plane throug two points, that, for which the height of the centre of gravity above a give horizontal straight line below the given points is a minimum, is a catenary.

15. Solve the equation $\frac{dy}{dx} + Py = Q$ where P, Q are functions of only.

Solve $\sqrt{a^2 - x^2}\,\frac{dy}{dx} + y = \sqrt{a^2 - x^2} + x$.

16. Show how the complementary function of the linear differentia equation with constant coefficients can be found. Consider the case wher the auxiliary equation has equal roots.

Solve the equation :—

$$a^2\,\frac{d^2y}{dx^2} + 2a\,\frac{dy}{dx} + y = a^2 \cosh\frac{x}{b}$$

and consider the case of $b = a$.

17. Transform the equation $x^4\,\frac{d^2y}{dx^2} = y$ by the substitution $Y = \frac{y}{x}$ $X = \frac{1}{x}$ and hence solve the equation.

18. If $y = v$ is a known integral in the complementary function o $\frac{d^2y}{dx^2} + P\,\frac{dy}{dx} + Qy = X$, where P, Q, X are functions of x only, find th complete solution.

19. If u, v are two known integrals of the Riccati equation

$$\frac{dy}{dx} = y^2\,\phi(x) + y\,\chi(x) + \psi(x).$$

Prove that the general solution is given by

$$y - u = (y - v)\,e^{\int (u - v)\,\phi(x)\,dx}.$$

THURSDAY, 28TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

ALGEBRA, DETERMINANTS AND THEORY OF EQUATIONS.

N.B.—Full marks will be obtained by answering about two-thirds of this paper.

1. Without assuming the binomial theorem for any index, find the number of homogeneous products of r dimensions that can be formed out of the n letters $a, b, c, \ldots$

If $x + y + z = 1$; $ax + by + cz = k$; $a^2x + b^2y + c^2z = k^2$; prove that

$$a^r x + b^r y + c^r z = k^r - (k - a)(k - b)(k - c)\,H_{r-3}$$

where H_p is the sum of homogeneous products of a, b, c, k of p dimensions.

2. Prove that $\left(\dfrac{a_1 + a_2 + \ldots. + a_n}{n}\right)^n > a_1 a_2 \ldots a_n$ unless $a_1, a_2, \ldots, a_n$ are all equal.

If $s_1 = a_1 + a_2 + \ldots + a_n$ and $s_2 =$ the sum of the products of $a_1, a_2, \ldots, a_n$ taken two together prove that

$$(s_1 - a_1)^{a_1}\,(s_1 - a_2)^{a_2} \ldots (s_1 - a_n)^{a_n} < \left\{\frac{(n-1)\,s_1}{n}\right\}^{s_1},$$

$$\text{and also} < \left\{\frac{2\,(n-1)\,s_2}{n}\right\}^{s_1/2}$$

3. Prove the test for convergency of a series given by Cauchy that $\Sigma f(n)$ and $\Sigma a^n f(a^n)$ are both convergent or both divergent if the function $f(x)$ is a positive decreasing function so that $\underset{x=a}{\text{Lt}}\, f(x) = 0$.

Examine the convergence of the two series

$$(1)\quad 1 + \left(\frac{1}{2}\right)^p + \left(\frac{1\cdot 3}{2\cdot 4}\right)^p + \left(\frac{1\cdot 3\cdot 5}{2\cdot 4\cdot 6}\right)^p + \ldots.$$

$$(2)\quad (2 - e) + (2 - e)(2 - e^{\frac{1}{2}}) + (2 - e)(2 - e^{\frac{1}{2}})(2 - e^{\frac{1}{3}}) + \ldots.$$

4. Show how to find the sum of the series formed by taking every rth term of a given series, commencing at any one of the first r terms.

Prove that the infinite series $x + \frac{x^6}{6!} + \frac{x^{11}}{11!} + \frac{x^{16}}{16!} + \ldots$ is equivalent to

$$\tfrac{1}{5}e^{x} + \tfrac{2}{5}e^{x\cos\frac{2\pi}{5}}\cos\left(\frac{2\pi}{5} + x\sin\frac{2\pi}{5}\right)$$
$$+ \tfrac{2}{5}e^{x\cos\frac{4\pi}{5}}\cos\left(\frac{4\pi}{5} + x\sin\frac{4\pi}{5}\right).$$

5. Prove the law for the formation of the successive convergents of the fraction

$$\frac{a_1}{b_1 +}\,\frac{a_2}{b_2 +}\,\frac{a_3}{b_3 +}\ldots.$$

Shew that the nth convergent of

$$\frac{1}{\alpha + \beta -}\,\frac{\alpha\beta}{\alpha + \beta -}\,\frac{\alpha\beta}{\alpha + \beta -}\ldots.$$

is $\dfrac{\alpha^n - \beta^n}{\alpha^{n+1} - \beta^{n+1}}$.

6 If n be a prime number and N prime to n, $N^{n-1} - 1$ is a multiple of n. If $2n + 1$, $4n + 1$, $8n + 1$ are all primes, show that

$$\frac{1}{(2n + 1)(4n + 1)(8n + 1)}$$

can be reduced to a pure circulating decimal.

7. Obtain the general solution of the indeterminate equation $x^2 + y^2 = z^2$. Show that $x_1 = (a^2 - b^2)(c^2 - d^2)(e^2 - f^2)$, $x_2 = 2ab(c^2 - d^2)(e^2 - f^2)$, $x_3 = 2cd(a^2 + b^2)(e^2 - f^2)$, $x_4 = 2ef(a^2 + b^2)(c^2 + d^2)$ are such that $x_1^2 + x_2^2$, $x_1^2 + x_2^2 + x_3^2$ and $x_1^2 + x_2^2 + x_3^2 + x_4^2$ are all squares, and hence show how to obtain an infinite number of sets of numbers $x_1, x_2 \ldots, x_n$ such that $x_1^2 + x_2^2$; $x_1^2 + x_2^2 + x_3^2$, $x_1^2 + x_2^2 + x_3^2 + x_4^2$, $\ldots\, x_1^2 + x_2^2 + x_3^2 + \ldots + x^2_n$ are all squares.

8. The chance that an event takes place in any one trial is a; find the chance that it should happen (1) exactly r times, (2) at least r times in n trials. For what value of r is the chance in case (1) greatest if $a = \frac{1}{3}$ and $n = 50$?

A, B, C are three candidates for three different constituencies. The chance that a general election takes place this year is p; if it do, their chances of being returned are a_1, b_1, c_1 respectively; if it be postponed, their chances are a_2, b_2, c_2. Find the chance that (1) all three, (2) two of them, (3) one of them, (4) none of them, will be in the next Parliament.

9. Define the reciprocal of a determinant and prove that it is equal to the $(n - 1)^{\text{th}}$ power of the determinant itself, where n is its order.

If $\begin{vmatrix} A_0 & B_0 & C_0 & D_0 & \ldots \\ A_1 & B_1 & C_1 & D_1 & \ldots \\ \cdot & \cdot & \cdot & \cdot & \ldots \\ A_n & B_n & C_n & D_n & \ldots \end{vmatrix}$ be the reciprocal of $\begin{vmatrix} 1 & 1 & 1 & 1 & \ldots \\ a & b & c & d & \ldots \\ a^2 & b^2 & c^2 & d^2 & \ldots \\ \cdot & \cdot & \cdot & \cdot & \ldots \\ a^n & b^n & c^n & d^n & \ldots \end{vmatrix}$

prove that $(-1)^{n-}\dfrac{A_r}{A_n}$ is equal to the sum of all the products of $b, c, d, \ldots$ taken $n - r$ at a time.

10. Prove that the roots of the equation

$$\begin{vmatrix} a-x & h & g \\ h & b-x & f \\ g & f & c-x \end{vmatrix} = 0$$

are all real provided a, b, c, f, g, h are all real.

Show further that the roots of the equation

$$\begin{vmatrix} a^2+g^2+h^2-x^2 & fg+h(a+b) & fh+g(a+c) \\ fg+h(a+b) & b^2+h^2+f^2-x^2 & gh+f(b+c) \\ fh+g(a+c) & gh+f(b+c) & c^2+f^2+g^2-x^2 \end{vmatrix} = 0$$

are $\pm x_1, \pm x_2, \pm x_3$ where x_1, x_2, x_3 are the roots of the original equation.

11. Prove that every equation of the nth degree has a root and give any method for approximating to an imaginary root of the equation.

12. In any algebraic equation, obtain formulæ for finding the sums of any powers of the roots in terms of the coefficients.

If α, β, γ be the roots of the equation $x^3 + px - r = 0$, find the values of $\Sigma\alpha^4$ and $\Sigma(\beta\gamma)^4$ and prove that

$$\alpha^3\beta + \beta^3\gamma + \gamma^3\alpha = \alpha^3\gamma + \beta^3\alpha + \gamma^3\beta = -p^2$$

13. If it be known that two roots of an equation of the n^{th} degree are connected by a known relation, show how they can be found.

Prove that the equation $x^5 + ax^4 + bx + c = 0$ will have the sum of three of its roots equal to zero, provided that $(ab + c)^2 = ca^5$ and can then be reduced to a cubic and a quadratic.

Apply the method to solve the equation

$$x^5 + 2x^4 + 3x + 18 = 0.$$

14. If p be the numerical value of the greatest negative coefficient in an equation of the n^{th} degree, and x^{n-r} the highest power of x which has a negative coefficient, $1 + \sqrt[r]{p}$ is a superior limit of the positive roots.

Find two limits between which all the real roots of the following equation lie:—

$$x^8 + 4x^6 + 3x^5 - 6x^4 - 16x^3 - 2x + 1 = 0.$$

15. Prove the identity

$$(\alpha + \beta + \gamma)(\alpha + \omega\beta + \omega^2\gamma)(\alpha + \omega^2\beta + \omega\gamma) = \alpha^3 + \beta^3 + \gamma^3 - 3\alpha\beta\gamma$$

and thence explain Cardan's solution of the cubic.

Solve $x^3 + 3\alpha x^2 + 3(\alpha^2 - \beta\gamma)x + \alpha^3 + \beta^3 + \gamma^3 - 3\alpha\beta\gamma = 0$; and show that the sum of the cubes of the roots of this equation is equal to

$$(\beta + \gamma - 2\alpha)(\gamma + \alpha - 2\beta)(\alpha + \beta - 2\gamma) - (\alpha + \beta + \gamma)^3.$$

16. Explain Sturm's Theorem and show how it can be used in the numerical solution of equations.

Find by Horner's method the positive root of the equation

$$x^3 + 3x^2 + x - 6 = 0$$

to six places of decimals; explaining the steps of the process.

17. Explain the terms discriminant, invariant and covariant of a quantic and obtain the characteristic differential equations satisfied by the last two.

Prove any covariant, or in particular invariant, of any covariant of a quantic is a covariant, or in particular invariant, of that quantic. Illustrate by finding the invariant of the covariant of the quantic

$$ax^3 + 3bx^2 + 3cx + d.$$

18. Show that a real homogeneous quadratic function of n variables can be expressed as the algebraic sum of squares whose number is n or less in an infinite number of ways; but that whatever way the transformation is made the number of positive signs and the number of negative signs are always the same.

Prove that every ternary cubic can be expressed in the form

$X^3 + Y^3 + Z^3 + 6m\,XYZ$ where m is an absolute invariant.

FRIDAY, 29TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HYDROSTATICS, HYDRODYNAMICS AND ASTRONOMY.

N.B.—**Candidates are not expected to answer the whole paper.**

1. Obtain formulæ for the determination of the centre of pressure of any plane area.

A lamina wholly immersed in homogeneous liquid, in a vertical plane, is moved without rotation. Prove that the vertical distance between the centre of pressure and the centre of gravity varies inversely as the depth of the centre of gravity below the surface.

2. An elliptic lamina is immersed vertically in a liquid and touches the surface of the liquid at a point O. Find the centre of pressure, and show that the locus of the centre of pressure, referred to the vertical and horizontal lines through O, as different points of the perimeter of the ellipse are at O is the quartic

$$x^2 (x^2 + y^2) - \tfrac{25}{16}\, x^2 (a^2 + b^2) + (\tfrac{25}{16})^2\, a^2 b^2 = 0$$

where a, b are the semi-axes of the perimeter of the lamina.

3. A regular tetrahedron has one edge fixed in the surface of a liquid. Show that it will be in equilibrium with the other edge inclined to the vertical at an angle $\operatorname{cosec}^{-1} 3$, if the density of the tetrahedron is to that of the liquid as $19 : 64$.

4. A solid right circular cone of radius r and height h is placed inside a vertical cylinder also of radius r, their bases being in contact, and water is poured into the cylinder so that the cone is just immersed. Show that to raise the cylinder vertically so as to be just clear of the water, work must be done equal to $\frac{2}{3}\, Wh \left(1 - \dfrac{7}{8s}\right)$, where W is the weight of the cone and s (> 1) is the specific gravity of the cone.

5. Define the metacentre and prove that its height above the centre of buoyancy for a symmetrical solid is Ak^2/V.

A square lamina is floating with its plane vertical in water. Prove that the position of equilibrium in which a side is horizontal is stable if s the specific gravity is $< \frac{1}{6}(3 - \sqrt{3})$ or $> \frac{1}{6}(3 + \sqrt{3})$ and the position in which a diagonal is vertical is stable if s lies between $\frac{9}{32}$ and $\frac{23}{32}$.

6. If t, t' are the principal tensions, r, r' the normal curvatures in the directions of the principal tensions and p the normal pressure on a perfectly flexible membrane prove the relation $\frac{t}{r} + \frac{t'}{r'} = p$.

In the case of a flexible membrane in the form of a surface of revolution held with its axis vertical and filled with homogeneous fluid, find an equation from which the meridian tension can be found.

7. Find the equation of the capillary curve.

Show that in a fine capillary tube the free surface of the liquid is approximately spherical.

8. Prove that the catenoid is the only possible form of revolution of a liquid film when the pressure on both sides is the same.

9. Obtain the equation of continuity in polar coordinates in the form

$$\sin\theta \frac{\partial}{\partial r}(ur^2) + r\frac{\partial}{\partial\theta}(v\sin\theta) + r\frac{\partial w}{\partial\phi} = 0.$$

Deduce the form of Laplace's equation $\nabla^2 V = 0$ in polar coordinates.

10. Prove that a circular cylinder descending in an infinite liquid under the action of gravity (its generators being horizontal) moves with an acceleration $\frac{\sigma - \rho}{\sigma + \rho} g$ where σ, ρ are the densities of the cylinder and liquid respectively.

11. Show that $\phi = -\frac{\omega^2}{4}(a+b)^2 e^{-2\xi} \sin 2\eta$ where $\xi + i\eta = \cosh^{-1}(x + iy)$ is the velocity potential produced by an elliptic cylinder rotating about its axis in an infinite incompressible fluid at rest at infinity.

12. Draw a figure showing the position of the ecliptic relative to th equator about August 20th in latitude 18° N. at noon.

13. Define, explaining the directions and points or circles from whic they are measured, hour angle, azimuth, right ascension.

Obtain formulæ adapted to logarithmic computation whereby knowin the hour angle and declination the azimuth and zenith distance may b found.

14. Two stars of declination δ and right ascensions a_1, a_2 are observe twice on the same night when they have the same azimuth. If t_1, t_2 are th times of observation show that

$$\cot\delta\cos\frac{a_2 - a_1}{2} = \cot\phi\cos\frac{t_2 - t_1}{2}$$

provided each of these is greater than $\sqrt{\sin^2\phi - \sin^2\delta}$, where ϕ is th latitude of the place of observation and $\phi < \delta$.

15. For a place not within the arctic circle, show that the extre azimuth of the sun at rising is $\tan^{-1}\left[\operatorname{cosec}\omega\sqrt{\cos\frac{\phi+\omega}{2}\cos\frac{\phi-\omega}{2}}\right.$ where ϕ is the latitude and ω the obliquity of the ecliptic.

If when the sun's declination is δ it rises at a point distant α and β fr the extreme points of rising, prove that

$$\tan\tfrac{1}{2}\alpha\tan\tfrac{1}{2}(\omega - \delta) = \tan\tfrac{1}{2}\beta\tan\tfrac{1}{2}(\omega + \delta).$$

16. Assuming that $\mu^{n+1} r =$ constant obtain Simpson's formula for refraction $\frac{1}{n}\left\{z - \sin^{-1}\left(\sin z \,.\, \mu_0^{-n}\right)\right\}$, where z is the apparent zenith distance.

Assuming the usual law of refraction $k \tan z$ show that the sun's disc is distorted into an ellipse whose semiaxes are $a\,(1 - k)$, $a\,(1 - k \sec^2 z)$ where a is the sun's angular radius and z the zenith distance of its centre.

17. Find the greatest distance between the centre of the moon and the apex of the Earth's shadow in order that (1) a partial, (2) a total eclipse of the moon may take place.

How is the effect of refraction allowed for?

18. Prove Mayer's formula for the correction to the time of transit of a star, viz. $\left\{a \cos(\phi - \delta) + b \sin(\phi - \delta) + c\right\} \sec \delta$.

19. Prove that owing to aberration a star describes a small ellipse in the course of the year.

Prove that the corrections to be applied to the true latitude and longitude λ, l to obtain the apparent are $-\,k \sin\lambda \sin(\odot - \lambda)$, $-\,k \sec\lambda \cos(\odot - \lambda)$, where $\odot$ is the longitude of the sun and k the constant of aberration.

FRIDAY, 29TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PURE GEOMETRY AND PLANE AND SPHERICAL TRIGONOMETRY.

N.B.—Ful marks will be obtained by answering about twothirds of the paper

1. Given the sides of a polygon in magnitude, show that its area is greatest when it is inscribable in a circle.

Given the sides of a quadrilateral, show how to construct it (by the methods of pure geometry) so as to be cyclic.

2. What is the cosine circle of a triangle? Find an expression for its radius in terms of the sides and angles.

If P is the centroid of a triangle ABC and Q the point of concurrence of its symmedians, prove that

$$PA \cdot QA \cdot BC + PB \cdot QB \cdot CA + PC \cdot QC \cdot AB = BC \cdot CA \cdot AB.$$

3. A circle is inverted with respect to a point. Find the position of the centre and the magnitude of the radius of the inverse circle.

POQ is a chord of a leminiscate passing through the node O. A circle is drawn passing through the node, touching the leminiscate at R and meeting QP produced in S. Prove that the angles PQR and PRS are equal.

4. Prove that a plane section of a right circular cone is a conic of which the foci are the points of contact with the plane of the two spheres which can be inscribed in the cone so as to touch the plane.

If any two spheres inscribed in the cone cut the plane in two circles, show that the sum or difference of the lengths of the tangents from a point of the conic section to the circles is constant for all such points.

5. Prove that a circle round a triangle self-conjugate with respect to a rectangular hyperbola passes through the centre

A, B, C, D form a harmonic range. A conic through A and C circumscribes a triangle self-conjugate with regard to a conic through B and D. Show that the tangents at these points intersect on the first conic.

r construction for finding the points in which a given line hrough five given points.

nts $A, B, C, D, E, C', D', E'$, determine graphically the of intersection of the conics through A, B, C, D, E C', D', E'.

the polar reciprocal of any conic (S) with respect to a nic. Find the nature of this new conic.

each of two parabolas, at one of their points of intersection, axis of the other ; prove that the polar reciprocal of either e other is a hyperbola whose asymptotes are these two

the circles on the three diagonals of a quadrangle as axial.

theorem by projection and by reciprocation.

t

$$. \tan\frac{4\pi}{7} . \tan\frac{6\pi}{7} = \sqrt{7},$$

$$\frac{\pi}{7} + \tan^2\frac{3\pi}{7}\Big)^{-1} + \left(\tan^2\frac{3\pi}{7} + \tan^2\frac{5\pi}{7}\right)^{-1}$$

$$\times \left(\tan^2\frac{5\pi}{7} + \tan^2\frac{\pi}{7}\right)^{-1} = \frac{17}{26}.$$

e sum of the series

$$\sec 2\theta + \tan 2\theta \sec 2^2\theta + \ldots\ldots\ldots + \tan 2^{n-1}\theta \sec 2^n\theta$$

;

$$\frac{\theta}{2} - \frac{2}{\cot\frac{\theta}{4}} - \frac{2}{\cot\frac{\theta}{8}} - \ldots\ldots\ldots \text{ to infinity} = \tan\theta.$$

the expression for $\sin\theta$ as an infinite product by factorizing

$$\frac{\left(1 - \frac{i\theta}{n}\right)^n}{2i}$$ and then taking the limit by making n infinite.

$$\cos\left(\frac{\pi}{2}\sin\theta\right) = \frac{\pi}{2}\cos^2\theta\left(1 + \frac{\cos^2\theta}{2\cdot4}\right)\left(1 + \frac{\cos^2\theta}{4\cdot6}\right)\ldots$$

the formula

$$\frac{\pi}{4}\sec\frac{\pi x}{2} = \sum_{r=0}^{r=\infty}\frac{(-1)^r(2r+1)}{(2r+1)^2 - x^2}$$

1 and $1 > x > 0$, and if $\tan^{-1}x$ mean the least positive angle it is x, show that

$$1)^r \tan^{-1}\frac{(2r+1)x}{(2r+1)^2 - x^2} = \tan^{-1}\left\{\sinh\frac{\pi x}{4}\sec\frac{\pi x\sqrt{3}}{4}\right\}.$$

and prove Napier's analogies.

spherical triangle in which

$$A = 123^\circ 17', B = 62^\circ 44', c = 44^\circ 25',$$

14. Find the expression for the sine of half an angle of a spherical triangle in terms of its sides.

ABCD is a spherical quadrilateral whose sides are a, b, c, d. If the diagonals AC, BD be each a quadrant show that

$$\cos^2 a + \cos^2 b + \cos^2 c + \cos^2 d - 1 = (\cos a \cos c + \cos b \cos d)^2$$

15. Find in terms of the sides the angular radius of the small circle circumscribing a given triangle.

If R be the radius of the circumscribed circle of the triangle ABC, A being the right angle, prove that

$$\operatorname{cosec}^2 R = \frac{1 - \sin^2 \frac{b}{2} \sin^2 \frac{c}{2}}{\mathrm{sn}^2 \frac{a}{2}}.$$

16. Show that the area of a spherical triangle ABC on a sphere of radius r is $(A + B + C - \pi) r^2$.

If E be the spherical excess, prove the formulæ

$$(1) \quad \Sigma \cos \frac{a}{2} \sin \frac{b - c}{2} \frac{\sin \left(\frac{A}{2} - \frac{E}{2}\right)}{\sin \frac{A}{2}} = 0.$$

$$(2) \quad \tan \frac{E}{2} = \frac{\tan \frac{a}{2} \tan \frac{b}{2} \sin C}{1 + \tan \frac{a}{2} \tan \frac{b}{2} \cos C}.$$

17. If a point on a sphere be defined by its distance ϕ from a fixed point and the inclination θ of that distance to a fixed great circle passing through the fixed point, prove that the equation of the great circle passing through the points (a, α) and (b, β) is

$$\cot \phi \sin (\alpha - \beta) + \cot a \sin (\beta - \theta) + \cot b \sin (\theta - \alpha) = 0.$$

If x be the length of the arc drawn from the fixed point perpendicular to this great circle, prove that

$$\sin^2 (\alpha - \beta) \cot^2 x = \cot^2 a + \cot^2 b - 2 \cot a \cot b \cos (\alpha - \beta).$$

THURSDAY, 28TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

PHYSICS—PAPER I.

1. Give a description of S. H. M. and explain what is meant by the Amplitude, Period, Phase, and Epoch of S. H. M.

Draw the path of a particle performing S. H. M. in two directions at right angle to each other, supposing that the periods are in the ratio $\frac{3}{5}$. How is the curve altered by a difference of phase, and how is it affected by the amplitudes and by friction?

2. Prove that a homogeneous strain can be resolved into two strains, one of which changes the size but not the shape, while the other changes the shape but not the size. Find an expression for the work required to produce any

3. Find the loss of kinetic energy due to the impact of two bodies and discuss your result.

Two balls of mass 200 grs. and 100 grs. move with velocities of 4 ms. and 3 ms. per sec. and impinge obliquely. If their coefficient of elasticity is 0·5, and they make angles of $\sin^{-1}\frac{3}{4}$ and $\sin^{-1}\frac{3}{5}$ with the line of impact before striking, find their velocities and directions after impact.

4. Describe the phenomenon of surface-tension and calculate the height to which a liquid will rise or be depressed in an open capillary tube. Compare the vapour pressures on the surface of the liquid in and outside th tube.

5. Discuss the motion of a string displaced to form an arc of a curve o sines and then released.

6. Find the velocity of propagation of a disturbance along a stretche string.

7. Explain the formation of stationary waves in organ pipes.

8. Explain the interference of sound-waves and the formation of beats.

THURSDAY, 28TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER II.

Heat.

1. The Mechanical Equivalent of Heat has been calculated from the t specific heats of a gas. Explain the principle of this calculation. W assumption underlies this method? How was this assumption investiga by Joule and by means of Kelvin's porous plug experiment and with w result?

2. Indicate briefly the different methods that have been employed determining the density of vapours.

From the following data calculate the vapour density of the substa examined in an experiment made by the method of Gay Lussac, the dens of air being taken as unity :—

Weight of the substance taken	0·447
Observed volume of its vapour	120 c.
Corrected height of barometer	76·2
Difference of level of mercury inside and outside the tube.	6
Height of oil column	17
Temperature of oil bath	200°C.
Density of the oil	0·808.

3. Deduce a formula for the determination of the dew-point from o vations made by the Wet and Dry Bulb Thermometer (either Apjohr August's formula). What are the chief sources of error in this calcul and how do they affect the result? In actual practice how is the dew- obtained from such observations?

4. Explain *isothermal* and *adiabatic lines*.

Obtain an equation connecting the pressure and volume of a gas under adiabatic conditions. Shew how to determine experimentally by means of this relation the ratio of the two specific heats of a gas.

5. What is meant by the curves known as the *Steam Line*, the *Hoar-frost Line* and the *Ice Line*? What is meant by the *triple point* and what physical fact is implied in the existence of this point?

6. Give a precise definition of Conductivity for Heat.

Describe in detail the experiments of Forbes on the conductivity of metal bars. What were the data which he sought in these experiments and how did he proceed in calculating K from these data?

7. Explain fully Kelvin's method of deriving a scale of absolute temperature independent of the properties of any particular substance. State clearly the relation of this method to the Second Fundamental Principle of Thermodynamics.

8. Apply the method of Carnot's Cycle to the determination of the change in the melting point of ice due to change of pressure. Assuming that the volume of one cubic centimetre of water becomes 1·087 c.cm. when the water is frozen and that the latent heat of liquefaction of ice is 79·25, calculate the change in the melting point due to an increase of pressure of one atmosphere.

9. Write a note on the critical temperature of a liquid, giving an account of the different views which have been put forth as to the state of matter near the critical point.

In the light of these investigations what is the real distinction between a gas and a vapour?

FRIDAY, 29TH NOVEMBER,
[10-30 A.M. TO 1-30 P.M.]

PHYSICS—PAPER III.

1. State and discuss Gladstone and Dale's law for the variation of the refractive index with density.

2. Describe and explain the phenomenon observed when (*a*) unpolarised, (*b*) polarised light passing through two small appertures close together falls upon a screen. Explain also the influence of the colour of the light upon the phenomenon. How would you arrange the experiment if you wanted to use the phenomenon for measuring wave-lengths of light?

3. Find the relation which exists between the coefficient of reflection and that of refraction and hence show how the intensity of light reflected from a plate can be calculated.

4. Describe the diffraction grating and explain how it works. Show the advantage of grating spectra over refraction spectra.

5. Describe Babinet's compensator and its use.

6. Give a short account of the Kerr effects.

7. Give an account of Michelson and Morley's experiment for determining the relative motion of the earth and the luminiferous ether.

8. Explain the formation of the rainbow.

FRIDAY, 29TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

PHYSICS—PAPER IV.

Electricity and Magnetism.

1. Define *electric potential* and *capacity*.

Find the capacity of a condenser consisting of two parallel plates kept at a given distance and calculate the attraction between the plates for a given difference of potential. How is this calculation of the mutual attraction of two electrified discs employed in the determination of the absolute measure of an electromotive force in the Absolute Electrometer?

2. What is an *Electric Image*? Illustrate the use of this conception in the solution of problems of electrical distribution.

If a sphere be at zero potential and have its centre at a distance f from an external point at which a charge of m units of electricity is placed, show that the quantity of electricity on the sphere is $-\dfrac{am}{f}$, a being the radius.

3. Show that in a system of six conductors the diagonals are conjugate to each other if the products of the resistances in the opposite sides be equal. Explain the application of this proposition to the determination of th resistance of wires and of batteries.

When the resistances in the four sides are not all equal, at which point would you connect your battery and galvanometer respectively (*a*) when th resistance of the galvanometer is the greater, (*b*) when the resistance of th battery is the greater?

4. Describe any form of Quadrant Electrometer and shew that its deflec tions are approximately proportional to the difference of potential betwee the two pairs of quadrants.

How would you use such an electrometer in measuring the resistanc of a cell and in comparing the capacities of two given condensers?

5. Write a note on the mechanical effect of the kathode rays in a dis charge through a vacuum and their susceptibility to the influence of magnetic field What is the nature of the charge which they carry? Wha explanation has been offered of the fact that they are not deflected by a electrostatic field when they pass through a gas?

6. Give an account of the results obtained by Hertz in his researches on th propagation of electric waves by means of wires. Explain his statement th all propagation of electric disturbances takes place through non-conductor and conductors oppose this propagation with a resistance which in the case rapid alternation is insuperable. How does he reconcile this view with th ordinary facts of electric conduction through wires?

7 Define *Magnetic Shell*. Show that a magnetic shell is equivalent a current round its edge. Find the potential at any external point due a shell of given strength.

8. Shew how to calculate the intensity of the magnetic field due to a curre travelling in a circular conductor. In a tangent galvanometer what is t region of approximately uniform field?

Describe the arrangement of the coils in Helmholtz's galvanometer a explain its advantages in respect of uniformity of magnetic field.

9. Explain carefully the meaning of *self-inductance*, *lag*, and *impedance* an electric circuit.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PHYSICAL CHEMISTRY.

N.B.—Five questions may be answered, but equal credit will be given to exceptionally good and complete answers to a smaller number. Question 1 must be answered.

1. Write an essay on *one* of the following subjects:—

(*a*) The nature of Colloid Solutions.

(*b*) The Constitution of Alloys.

(*c*) The effect of Traces of Water on Chemical Reactions.

2. Describe such experiments as you would propose to make to ascertain how the formation of calcium bicarbonate from calcium carbonate, water and carbon dioxide is influenced by temperature, and whether that influence increases regularly with rise of temperature or no.

3. Attempts have recently been made to determine the age of rocks by an estimation of the quantity of radio-active constituents and their supposed decomposition products. On what principles are such attempts based, and by what experiments can they be justified?

4. The atomic weights of zinc and iron are said to be in need of verification. What reactions of either (*one only*) of these metals would you choose as being suitable for use in such verification, and why?

5. How do you account for the existence of supersaturated solutions? Under what conditions are they usually formed?

6. The rate of reaction between iodine and potassium phenyl-propiolate in equivalent quantities was determined by measuring the rate of disappearance of the iodine. 25 cc. of the solution were withdrawn after suitable intervals from the reaction mixture, and titrated with decinormal sodium thiosulphate. The following figures were obtained:—

Time in hours.	Titration.
0	24·96 cc.
20	10·39 cc.
24	9·25 cc.
28	8·45 cc.
42	6·36 cc.

What is the order of the reaction, and what is the velocity constant?

7. How could you, by an investigation of the specific heat of a gas at constant pressure, and also at constant volume, determine whether the molecules of the gas are composed of one or more atoms? Give instances in which the method has been usefully applied.

8. What experiments would you propose to carry out to determine whether the formula of potassium permanganate in solution should be represented by $KMnO_4$ or $K_2Mn_2O_8$? As many methods as possible should be given.

TUESDAY, 26TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

INORGANIC CHEMISTRY.

N.B.—Five questions may be answered, but equal credit will be given to exceptionally good and complete answers to a smaller number. Question 1 must be answered.

1. Write an essay on *one* of the following subjects :—
   (*a*) Life and work of Berzelius or Stas.
   (*b*) Liquid air and its applications.
   (*c*) Water of crystallisation: its nature and condition.

2. Give some account of the compounds of nitrogen and hydrogen.

If you assume nitrogen to be trivalent how can you account for their existence?

3. The practical importance of metallic sodium has very much increased in recent years. Give an account of the changes which have in consequence been made in the methods by which it is technically produced, and a short description of the method now adopted.

4. What is the nature of the so-called 'per' salts? How are they usually produced, what is their relation to peroxides, and for what purposes are they employed?

5. Draw up a scheme for the quantitative analysis of a mixture of a chloride, hypochlorite, and chlorate.

6. Certain substances have the property of quickening reactions when they are present (catalysts). Give some account of how the properties of such substances are affected by concentration, temperature, or other physical conditions. Is there any analogy between these substances and ferments? If so, in what way?

7. Give some account of the electric furnace, the purposes for which it is used, and the special substances in connection with which it has been most largely employed.

8. What is the nature of 'producer gas', and how is it obtained? What applications can be made of it as a fuel, a reducing agent, and as chemical reagent in other directions?

WEDNESDAY, 27TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

ORGANIC CHEMISTRY.

N.B.—Five questions may be answered, but equal credit will be given to exceptionally good and complete answers to a smaller number.

Question 1 must be answered.

1. Write an essay on one of the following subjects:—
   (*a*) Recent work on the nature of the proteids.
   (*b*) The use of the polarimeter as a means of investigating the constitution of organic compounds.
   (*c*) The use of the alkyl compounds of magnesium in organic synthesis (Grignard's reaction).

2. What is polymerisation? What classes of organic substances most frequently and easily polymerise, and under what conditions does this usually take place? Give instances, especially of any which are or may be used on an industrial scale.

3. A sample of an insecticide comes into your hands, in the form of a paste, which is evidently a mixture of soap and an organic substance, the latter forming the active part of the mixture. The whole forms an emulsion with water. How would you proceed to investigate the nature of the material?

4. How would you investigate a substance supposed to have the formula $(CH_3)_2 : CH . CHOH . CH_2 . COOH$, with a view to proving its constitution? How would you then synthesise it? What substances would you expect to be produced by the action of (1) chlorine, (2) phosphorus pentachloride and (3) oxidising agents upon it?

5. Write a short account of the use of electrolytic reduction methods in the preparation of organic compounds.

6. Under what conditions are alkaline oxidising agents employed in organic chemistry? Specify some of the agents available, and the conditions under which you would use them.

7. The leaves of a plant contain an essential oil. How would you determine the quantity of the latter, and then proceed to ascertain its nature, so far as the class of substances to which it belongs is concerned?

8. How would you synthesise quinoline, and prove that the compound you obtain has really the structure you propose for it? How far are similar methods applicable in preparing other nitrogen 'ring' compounds?

9. How has the difference between the structure of the various sugars of the formula $C_6H_{12}O_6$ been determined?

MONDAY, 25TH NOVEMBER.

[10 30 A.M. TO 1-30 P.M.]

ZOOLOGY—FIRST PAPER.

N.B.—Draw diagrams where required.

1. Give a short account of the Parasitic Protozoa or Sporozoa, and give structure and life history of Monocystis.

2. Describe the structure of the nervous system and sense organs of An

3. Describe the general organisation of Holothuroidea.

4. Describe the general characters of the subclass Entomostraca, and gi comparative account of its various groups.

5. Give the structural characters and development of Peripatus, and dis its relationship and zoological position.

MONDAY, 25TH NOVEMBER.

[2 30 P.M. TO 5-30 P.M.]

ZOOLOGY—SECOND PAPER.

N.B.—Draw diagrams where required.

1. What structures arise from the hyoid and mandibular arches and t clefts between them, in the embryos of the several groups of the Vertebrata ?

2. Give an account of the structure of the pelvis in living and exti Reptiles.

3. Give a short account of the various forms of copulatory organs among Vertebrates.

4. Discuss the skeletal peculiarities of Cetaceans.

5. Give a brief account of Mendel's discoveries. State his results in the fo of a law. What theoretical interpretation did he advance for " Mendelism " ?

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

BOTANY—FIRST PAPER.

1. Describe the chemical characters and microchemical reactions of Pect Callose, Suberin, and Cutin.

2. Give a description of the water stomata, and mention the plants a parts of plants where they are met with, and compare them with the air stoma

3. Describe the phenomenon of weeping or bleeding when the stem is c and give the explanations which have been put forward to account for it.

4. What is Symbiosis ? Illustrate it by a few examples. What is relationship between Symbiosis and Metabiosis ?

5. Describe fully the process of formation of Proteids as the result of pl metabolism.

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

BOTANY—SECOND PAPER.

1. Describe the protective arrangements by which the pollen of Flower Plants escapes damage by water.

2. Describe the process of fertilisation and embryogeny in a typical Gym sperm. Give the distinguishing characters of the orders of Gymnosperms.

3. Give an account of the flowers that are pollinated by Flies (Diptera), describing the striking floral mechanisms that assist cross-fertilisation.

4. How are Monocotyledons classified into groups or series according to the natural system adopted by Vines and Bentham and Hooker? Give the distinguishing characters of the series.

5. Give the general characters of the N. O. Cyperaceæ. Name the indigenous plants belonging to them, and discuss their affinities with allied orders.

WEDNESDAY, 27TH NOVEMBER.

[10-30 A.M. TO 1-30 P M.]

GEOLOGY—FIRST PAPER.

1. Classify and describe the different leading types of mountains and mountain structures.

2. What explanations have been put forward as regards the cause of the remarkable change of climate during the Pleistocene time?

3. Give an account of the group of volcanic rocks belonging to the Ultra-basic Series, describing their mineral composition and their distinctive characters.

4. Give an account of the nature of deposits in Salt and Bitter Lakes.

5. Give a short account of the nature and results of Contact Metamorphism, and describe in detail Marmarosis and Dolomitisation.

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

GEOLOGY—SECOND PAPER.

1. Describe the axial relations in six Crystallographic Systems, and mention the principles of Crystallographic Notation of Naumann and Miller.

2. Give an account of the Dharwar or Huronian System, and mention the chief minerals of economic value occurring there.

3. State the various views which have been advanced as to the history of Coal Streams, and the formation of Coal Basins.

4. Discuss the nature of Eozoon and Oldhamia, and give reasons for and against their being considered to be of organic origin.

5. Write what you know concerning the nature and stratigraphical ranges of the following Fossils:—Clisiophyllum, Ventriculites, Lithostrotion, Euomphalus, Siphonia, Inoceramus, Olenellus, Platysomus, Voltzia, Montlivaltia.

FRIDAY, 29TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

सिद्धान्तबिन्दौ—

१. तत्पदस्य त्वंपदस्य च वाच्यार्थस्य लक्ष्यार्थस्य च समर्पिकाः श्रुतीः प्रदर्श्य ताः श्रुतीरन्तरेण तत्त्वंपदार्थज्ञानं कुतो न भवति श्रुतिभिश्च कथं भवति तत्प्रदर्शनीयम् ।

२. 'तत्र पञ्चानामेव मेलनेप्यवयुत्यानुवादेन त्रिवृत्करणोपपत्तिः । त्रिवृतमेवेति मतकल्पनायां वाक्यभेदप्रसङ्गः । त्रिवृत्कुर्वत उपदेशादिति सूत्रं त्वनुवादकत्वान्न पञ्चीकरणं न्यायसिद्धं बाधितुमुत्सहते ।' एतद्व्याख्येयम् ।

३. ज्ञानस्यैकत्वमनेकत्वं वा तत्साधकबाधकप्रमाणैरुपपादनीयम् ।

ब्रह्मसूत्रतात्पर्यविवरणे—

४. कारणत्वेन चाकाशादिष्वित्यधिकरणं प्रदर्श्य तस्याध्यायसंगतिः पादसंगतिः पूर्वोत्तराधिकरणाभ्यां सह संगतिश्च प्रदर्शनीया।

५. कृतप्रयत्नापेक्षस्तु०, तद्भूतस्य तु नातद्भावो०, युक्तेश्च, ज्योतिषि भावाच्च, एवमप्युपन्यासा० एतत्सूत्रपञ्चकस्यार्थो लेख्यः ।

६. आसीनः संभवादित्यासननियमः कीदृशोपासनेषु ब्रह्मसूत्रतात्पर्यविवरणे प्रतिपादितः ।

७. विद्याया उत्पत्तौ कर्मापेक्षाऽथवा फल उतोभयत्र किंवा न क्वचिदपि तत् सर्वापेक्षेति सूत्रानुसारेण विवेचनीयम् ।

८ 'किं च कार्यकारणयोर्द्रव्यगुणाद्योरश्वमाहिषवदत्यन्तभेदबुद्ध्यभावात्तादात्म्यमङ्गीकार्यम् । समवायकल्पने तस्य नित्यत्वानित्यत्वाभ्यां व्याहतत्वात् । अत उक्तं युक्त्यानन्यत्वम्' एतद्व्याख्येयम् ।

९. तं वा देवमात्मबुद्धिप्रकाशमिति श्रुत्या समाननामरूपत्वं कथं सिध्यति तद्विवेचनीयम् ।

साधारणप्रश्नाः—

१०. (क) तदात्मानं स्वयमकुरुतेति श्रुतिर्नोपपद्यते । पूर्वसिद्धस्य सतो ब्रह्मणः क्रियमाणत्वायोगात् ।

(ख) न च ज्ञानकर्मणोर्विलक्षणत्वात्कथं कार्यैकत्वम् ।

(ग) नन्वनारभ्यो मोक्षः कथमस्य कर्मणः कार्यः ।

(घ) ननु दुःखमहमस्वाप्समिति कस्यचित्कदाचित्परामर्शात्सुषुप्तौ दुःखानुभवोऽप्यस्तु ।

अत्राद्यानां त्रयाणामाक्षेपाणां ब्रह्मसूत्रतात्पर्यविवरणे, चतुर्थस्य च सिद्धान्तबिन्दौ कः परिहार उक्तः ।

११. आनन्दमयोऽभ्यासादित्यादिसूत्रगणप्रणयने सूत्रकृतां को हेतुर्ब्रह्मसूत्रतात्पर्यविवरणे प्रतिपादितः । तथा न शास्ता न शास्त्रमितिश्लोकप्रणयन आचार्याणां को हेतुः सिद्धान्तबिन्दौ प्रतिपादितः स लेख्यः ।

VIII.

FIRST EXAMINATION FOR THE DEGREE OF LL.B.

EXAMINERS.

R. K. Tarachand, B.A.
Sitaram S. Patkar, B.A., LL.B.
A. A. Chitre, B.A., LL.B.

Monday, 17th June.
[10-30 a.m. to 1-30 p.m.]

ROMAN LAW.

1. Write short notes on (*a*) *Capitis deminutio*, (*b*) *Donatio propter nuptias*, (*c*) *Senatus consultum Pegasianum*, (*d*) *replicatio*. 12

2. Define *Mandatum* and state the different forms of a mandate and the respective duties of the mandator and *mandatarius*. Distinguish between a mandate and the *negotiorem gestio*. 12

3. State the different kinds of partnership and the reciprocal rights and duties of partners in Roman Law. How was partnership ended? 12

4. State the essentials of the Roman Will and draw a contrast between the ancient and modern will. 10

5. Define *Locatio-conductio*. State the respective duties of the locator and the conductor when the contract relates to land. 12

6. State the provisions of Roman Law with reference to the contract of suretyship. 10

7. "The movement of the progressive societies has hitherto been a movement from status to contract." Explain this fully. 10

8. Discuss the theory of occupancy being the origin of private property. 12

9. State the origin and different forms of primogeniture and trace the causes of the spread of primogeniture. 10

Tuesday, 18th June.
[10-30 a.m. to 1-30 p.m.]

GENERAL JURISPRUDENCE.

Section I.

1. (*a*) What according to Austin is Jurisprudence and what is the use of studying it? 12

(*b*) Is Austin's theory of sovereignty applicable to a federal government?

2. Are any and, if so, which of the following things law according to Austin, and why, or why not:— 10

(*a*) The By-Laws of the Bombay Tramway Company.
(*b*) The Laws of Bridge.
(*c*) Order by the Commissioner of Police regarding Motor Ca
(*d*) The By-Laws of the Bombay Municipality.
(*e*) The By-Laws of a Rowing Club at Poona.

3. In administering the Law what authority, if any, ought according to Austin the Courts of a country to assign to— 10

(*a*) Customary Law.

(*b*) Decided Cases.

(*c*) The opinions of text writers.

(*d*) The usages of trade.

SECTION II.

4. Discuss the normal and necessary marks in a civilized commonwealth of justice administered according to law. 10

5. State the general conditions required for the validity of a local custom. 10

6. Discuss the sources of English Law and the origin of Equity jurisdiction in England. 10

SECTION III.

7. State shortly the difference between the legislation characteristic of the era of individualism and the legislation characteristic of the era of collectivism, and give a short analysis of the conditions or causes which have favoured the growth of collectivism in England. Can you give some recent instances of collectivist legislation in England? 15

8. Discuss the applicability of the maxim "He is not to be heard who alleges things contradictory to each other". What is the principle underlying the doctrine of election? 10

9. Explain and illustrate the maxim that "the law does not compel a man to do that which he cannot possibly perform". 10

Distinguish between initial impossibility and subsequent impossibility.

WEDNESDAY, 19TH JUNE.

[10-30 A.M. TO 1-30 P.M.]

CONTRACTS AND TORTS.

1. (*a*) What is the meaning of the "holder in due course" of a Bill of Exchange? 10

(*b*) In an action on a Bill of Exchange, on which party does the burden lie of proving that the plaintiff is or is not a holder in due course?

2. (*a*) What are the essentials of an agreement? Do the Courts of Law require any, and what additional formalities, before they will regard an agreement as an enforceable contract? 15

(*b*) Is there any, and what contract made in the following cases:—

(1) *A* takes his seat in a tramcar;

(2) *A* put a penny in the slot of an automatic machine at a Railway Station;

(3) *A* sees a book which he wants on a second-hand bookstall, marked Rs. 2-8. He has unfortunately left his purse at home; but the bookseller kindly promises to keep the book for him till the next day. That night the bookseller sells the book to *B* for Rs. 3?

3. *C*, with the intention of inducing *D*. to enter into a contract with him, makes a statement to *D*, which is in fact untrue, and thereby induces 12

D to enter into that contract. What are *D*'s rights, if the statement is made by *C*:—

(*a*) knowing that it was untrue ;
(*b*) recklessly, without caring whether it was true or false ;
(*c*) in good faith, but negligently ;
(*d*) in good faith, and without negligence ?

4. *A*. consigns from Surat unpressed bales of cotton to *B*. in Bombay. Would an action lie for damage to the cotton by fire at Dadar caused by sparks from (*a*) the M. P. Mill's chimney, (*b*) the engine of the train conveying the bales ? 12

5. A local authority is empowered to make a system of sewers for a town. It neglects to do so, and there is an outbreak of fever in the town. *A*. keeps a boarding-school in the town. His wife dies of the fever, and his pupils leave, and the school is broken up. Has *A*. any remedy against the local authority in respect of either the death of his wife or the loss of the profits of his school ? 10

6. *R*. is being driven down Esplanade Road in a vehicle which comes into collision with a tramcar and is injured. Both the driver of *R*.'s vehicle and the driver of the tramcar were guilty of negligence. Has *R*. any remedy against the Tramway Company, 10

(*a*) assuming that *R*. was being driven in a hired taxi-cab,

(*b*) assuming that *R*. was being driven by his own coachman in his own brougham ?

7. Is there any, and if so what, difference between the rules as to estimating the measure of damages in contract and in tort ? 8

8. State with examples the meaning of the following expressions :— 8

(*a*) Res ipsa loquitur (the thing speaks for itself) ;
(*b*) Waiver of tort ;
(*c*) Act of God.

9. What is meant by "a fair comment" ? In what cases and to what extent is it a defence to an action of defamation that the words are a fair comment ? Can a fair comment be written or published maliciously ? 15

THURSDAY, 20TH JUNE.
[10-30 A.M. TO 1-30 P.M.]

CRIMES AND CRIMINAL PROCEDURE.

1. State the extent of the applicability of the provisions of the Indian Penal Code to extra-territorial offences. 12

A, a native Indian subject, commits murder in England and escapes to Germany where he is arrested by the Indian Police under an illegal warrant and taken to India and charged with murder. What defence will you urge against the jurisdiction of the Indian Court ? Cite authorities.

A, a foreigner, administered poison to *B* in Goa. *B* died in consequence on his arrival in Bombay. A was found within jurisdiction of the Bombay Courts and charged with murder. Discuss the legality of the trial.

2. What are the two tests of criminal responsibility of a person of unsound mind ? When is unsoundness caused by reason of intoxication a good defence ? 10

H suffered from a delusion that the world was coming to an end and that he was commissioned by the Almighty to save mankind by the sacrifice of himself. *H* unwilling to commit suicide decided to commit an offence for which he would be hanged. *H* accordingly committed murder of *X*. Discuss the criminal responsibility of *H* with reference to the Indian Law.

3. What are the limitations to the right of private defence? Under what circumstances can a person take the risk of causing harm to an innocent person in the exercise of his right of private defence? 10

A, a detective police officer in plain clothes, enters by night *B*'s house to execute a warrant. *B* in good faith taking *A* for a house-breaker hits him with a heavy hammer. *A* fired a revolver and wounded *B*. Cross complaints were filed by both *A* and *B*. Discuss the criminal responsibility of each.

4. Define Extortion, Criminal breach of Trust and false document. 12

What is the difference between robbery founded on theft and robbery founded on extortion? Is the element of materiality essential to the offence of giving false evidence?

A, with a view to defeat the claims of the rightful heir of *B*, deceased, forged a will of *B* in his own favour. The will, however, not being properly attested as required by law, could not legally convey any interest to *A*. Has *A* committed any offence?

5. Define Bigamy. What is the proper forum for the trial of the offence of Bigamy? 12

A, a married Hindu, becomes a convert to Christianity. His wife then remarries. Has the wife committed any offence?

B, a married Christian, becomes a convert to Mohamedanism, and then marries a Mohamedan woman. What offence, if any, has *B* committed?

C, a married Mohamedan, becomes a convert to Christianity. His wife thereupon remarries. Has she committed any offence?

Give reasons for your answers.

6. Every offence shall ordinarily be inquired into and tried by a Court within the local limits of whose jurisdiction it was committed. State shortly the exceptions to this general rule. 10

A committed murder in Thana District and was arrested and put up for trial in the Sessions Court at Poona. *A* was convicted of murder and sentenced. Discuss the legality of the conviction.

7. Evidence shall be recorded in the presence of the accused. What are the exceptions to this general rule? In what cases is evidence given or taken in the absence of the accused relevant and admissible? 8

8. When is a previous acquittal or conviction of an accused a bar to his further trial? What acts and orders under the Criminal Procedure Code operate as acquittals? 10

9. What do you understand by a warrant case? Point out the essential difference in the procedure of a summons and a warrant case. 8

10. What are the powers of the High Court in Revision? In what cases has the Sessions Court got concurrent powers with the High Court in Revisional matters? 8

EXAMINERS.

R. K. TARACHAND, B.A.
S. S. RANGNEKAR, B.A., LL.B.
A. A. CHITRE, B.A., LL.B.

TUESDAY, 19TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

CONTRACTS AND TORTS.

N.B.—Candidates should always give reasons for their answers.

1. Distinguish and explain the seller's *lien* and his right of *stoppage in transitu*. 12

M, a timber merchant, agreed to buy from one *S* the trunks of certain teak trees belonging to *S*. He marked out the timber he wanted and paid for it and it only remained for *S* to sever the parts not wanted and send off the rest to the purchaser. Just then *S* became insolvent. *M* filed a suit against the Official Assignee to obtain delivery of the timber bought by him. Will he succeed?

2. Distinguish clearly between— 10

(1) An agreement and a contract.
(2) A void and a voidable contract.
(3) A wagering contract and a contingent contract.
(4) A sale and an agreement of sale.

Give illustrations where possible.

3. What are the rights of a surety against his principal and against his co-sureties? 10

A is indebted to *B* in the sum of Rs. 2,000. *A* as agent for *C* enters into a contract with *B* to buy Rs. 10,000 worth of cotton from *B*. *B* neither knew nor had reason to suspect that *A* was acting as agent for *C* in the transaction. What are the rights of *A*, *B* and *C*. Can *B* refuse to fulfil the contract? If so, when?

4. State clearly the rules of law governing appropriation of payments. 10

A, a merchant, bought sugar by sample to be delivered per rail at his shop. Sugar was tendered at the shop in intended execution of the contract, but *A* opened and examined a bag and found that it was not in accordance with the sample. He sold four bags and returned the rest to the seller. Advise the seller and *A* as to their rights.

5. State and compare the conditions and extent of the liability of (1) an Acceptor, (2) a Drawer and (3) an Indorser of a Negotiable Instrument. 12

A is the acceptor of a Bill of Exchange of which *B* is the payee. *C*, a holder, in due course sues *A* who pleads that *B* had no authority to indorse the Bill. How will you decide the suit?

6. What is an Acceptance for Honour and what is the position of an Acceptor for Honour as regards prior and subsequent parties to the Bill? 10

A put a blank acceptance in his desk. His clerk steals and fills it up as a complete bill for Rs. 200 and gets it discounted. The bill is dishonoured and a holder in due course sues *A* as Acceptor. Will he succeed?

7. (*a*) What is Contributory Negligence and how are the rights of parties affected by it? Give illustrations. 14

(b) *A* is a mechanic in *B's* service employed to work a machine saw which both *A* and *B* know is in a defective condition. *A* uses the saw with knowledge and appreciation of the risk Solely by reason of its defective condition he is injured. Has *A* a good cause of action against *B*? Would your answer be different if the case had arisen in England?

8. Explain the following :— 12

(a) (1) *Damnum sine iniuria.*

(2) Tort founded on a contract.

(3) *Sic utere tuo ut alienum non lædas* (enjoy your own property in such a manner as not to injure that of another person).

(b) What place has malice in the law of libel?

9. In what cases of tort is actual damage the gist of the action? 10

A asked *B*, the owner of a motor car, to let him have a ride with him, knowing that *B's* chauffeur *C* was incompetent. By reason of *C's* negligence an accident happened and *A* sustained severe injuries. *A* sues both *B* and *C* for damages. How will you decide the suit?

TUESDAY, 19TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

CRIMES AND CRIMINAL PROCEDURE.

1. *B*, a European British subject and Chief Engineer on a German Liner, committed murder of his assistant on the High Seas. The Liner stranded off Karwar and *B* was tried and convicted of murder by the Court of Sessions at Karwar. Is the trial in accordance with the provisions of the Admiralty Offences (Colonial) Act, and the Merchant Shipping Act? Give reasons. 10

2. What is lawful consent which either excuses or minimises an offence? 10

A husband was accused of causing a miscarriage of his wife with her consent and at her request. Has the husband or the wife committed any offence?

3. In the act of committing a dacoity one of the dacoits murdered an inmate of the house. The whole gang was put on their trial for murder. It was found as a fact that murder was not the common object of the gang. What is the criminal responsibility of each? 10

4. Define "stolen property". Can the thief and the receiver be tried together? How would a plea of guilty by the thief affect the receiver? 10

5. *R. M.* gave a cheque drawn in the name of *W. M.*, a fictitious person, upon a bank in which there was no account answering to that signature, but the prosecutor took the cheque believing that it was drawn in the prisoner's name. What offence do the facts disclose? 10

6. What is excessive publication? How far is a judge, an advocate and a witness responsible for defamatory statements made from the Bench, the bar and the witness-box? Cite authorities. 10

7. What is the difference between separable offences and distinct offences? How is the maximum punishment to be determined in each case, in one and the same trial? Give illustrations. 10

8. What are the general principles on which a Court is to be guided in the matter of granting sanction to prosecute? 10

One year after the termination of a suit, sanction to prosecute was asked for and obtained from a successor in office of the judge who heard the case. The person who obtained the sanction died without having acted upon it. Was the sanction good in its inception? Can a third person act upon it?

9. State shortly the essential points of procedure in a trial by jury before the Court of Session. What are the powers of the Hight Court where a sessions judge disagrees with the verdict of the jury? 10

10. What are the powers of the High Court and of the Governor-General-in-Council respectively in the matter of transfer of criminal cases? Under what circumstances are the powers exercised by the High Court? 10

MONDAY, 18TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

ROMAN LAW.

1. (*a*) What attempts were made in the sixth century after Christ to codify the Roman Law? 10

(*b*) Give a brief account of both the Digest and the Institutes of Justinian, mentioning the year in which they were published, by whom they were compiled, the object of their publication, and their distinguishing features.

2. Advise Titius as to his liabilities in the following cases:— 12

(*a*) While walking past the Forum his dog attacked and after a fight killed a dog of Seius.

(*b*) A dish of meat which had been served up for a stranger at a restaurant was during the latter's temporary absence eaten by Titius.

(*c*) His slave negligently killed a horse belonging to his neighbour Piso.

3. Advise Maevius as to his rights in the following cases:— 12

(*a*) While walking past the Forum the signboard of a shop fell and broke his head.

(*b*) While staying at an inn a box of apples he had with him was purloined by one of the innkeeper's slaves.

(*c*) Having bought Davus as a slave from Massala at a bargain, Davus turned out to be a freeman.

4. (*a*) Compare Exchange (Permutatio) with the Contract of Sale (Emptio Venditio). 10

(*b*) What legal transaction is involved in taking a ticket for the theatre? Is it a contract of sale?

5. (*a*) What is an "aditio heredidatis"? 10

What benefits were accorded to children "in potestate," and to slaves declared free and nominated heirs by testament, respectively, in the case of a "damnosa hereditas" delate to them?

6. Write short notes on any 5 of the following:— 10

(*a*) Actio de peculio,
(*b*) Actio tributaria,
(*c*) Cautio,
(*d*) Mutuum,
(*e*) Beneficium abstinandi,
(*f*) Fideicommissum,
(*g*) Intercessio.

7. (*a*) Distinguish between Positive and Negative Prescription.

(*b*) To what extent has a bona fide possessor right to the fructus of things possessed by him?

8. Under what circumstances could one acquire possession through

(*a*) his slaves,
(*b*) free persons in his potestas?

9. State and briefly comment on the three agencies by which, according to Sir Henry Maine law is brought into harmony with the progress of society. Give instances from Roman Law.

MONDAY, 18TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

GENERAL JURISPRUDENCE.

N.B.—Answers to the three sections should be written in separate books.

SECTION I.

1. Explain the *marks* mentioned by Austin for distinguishing an *independent political society*. Give illustrations. How does Austin criticise Bentham's and Hobb's definition of an independent political society?

2. Distinguish *Positive Law* from *Positive Morality*, giving illustrations. Give some examples of *positive moral rules* which are laws improperly so called.

3. Discuss the following statement: "The law of God, positive law, and positive morality sometimes *coincide*, sometimes do not *coincide* and sometimes *conflict*."

4. Fully discuss the following:—

(*a* A command. (*b*) "The king is incapable of committing wrong."

(*c*) "Right is might."

SECTION II.

5. What do you understand by an action *in* the law. How far does the aw regard motive as distinct from intention?

6. What is the rationale of the system of ascribing authority to decided cases? What do you understand by *ratio decidendi* of a case?

7. How far has the Individualistic liberalism of old fostered the growth of democratic socialism of to-day in England?

SECTION III.

8. Explain the maxim that no man shall take advantage of his own wrong, and quote decided cases to illustrate its principle. State, giving reasons, whether this maxim is applicable where the right of a third party is affected.

9. What qualifications are made by decided cases in the maxim that an argument drawn from inconvenience is forcible in law (Co. Litt., p. 66a) and why are they made?

IX.

SECOND EXAMINATION FOR THE DEGREE OF LL.B.

T. M. Kajiji, M.A., LL.D.
J. R. Gharpure, B A., LL.B.
S. S. Rangnekar, B.A., LL.B.

Monday, 17th June.
[2-30 p.m. to 5-30 p.m.]

SUCCESSION and FAMILY RIGHTS.

N. B.—The answers to questions on Hindu Law may be chiefly confined to the Bombay School of the Law. Candidates should always give reasons for their answers.

1. Briefly state the essentials of a valid adoption and discuss the effect of an invalid adoption. 8

2. (*a*) Discuss the principle of Hindu Law that sons have a right to control the father in the alienation of family property and state the extent of its limits. 12

(*b*) A Hindu father borrows money for an immoral purpose. The creditor files a suit against him and his son and seeks to make the whole of the family property liable. The son disputes his claim. How would you decide the suit and what decree will you pass? Would your decision be different supposing the father died during the proceedings?

3. (*a*) Compare the rights of a son and a grandson as regards enforcing partition by a suit. 8

(*b*) Who are necessary parties to a suit for partition?

4. (*a*) *A*, a Hindu, dies leaving him surviving, *B* and *C* the sons and *D* the daughter of a predeceased daughter, *E* and *F* sons of another predeceased daughter, *G* his brother's son and *K* his grandmother. All of them claim the property. How will you distribute the property amongst them supposing the family is governed by the *Mayukha*? 11

(*b*) State briefly the principles of succession according to the *Mitâkshara* and mention the leading points of distinction between the *Mitâkshara* and the *Dâyabhâg*.

5. Write short notes on the following, giving illustrations wherever possible:— 10

(1) Ademption of legacies, (2) Onerous bequest, (3) Apratibandha succession, (4) Ariat, (5) Sulka.

6. (*a*) How does *Vijnâneshwara* define *Stridhan* and in what respects does his definition differ from that of Manu? 12

(*b*) A Hindu widow inherited property from her brother and died leaving her surviving *A* and *B*, the son and daughter respectively of her husband's brother, *C* her sister and *D* the son of a predeceased sister. Who is entitled to succeed to her property?

7. (*a*) Give shortly the definition, condition and legal effect of *Khula* as compared with *Talak*. Is a *Khula* void under any and what circumstances? 11

(*b*) A Mahomedan dies leaving him survivin
sister. His property is worth Rs. 50,000. H
Rs. 20,000 to *C*. The widow sells the family h
before the estate is distributed amongst the he
claim to *D* at the time of the purchase. Subse
suit to recover his money and to attach the
purchaser *D*. He comes to you for advice.
him, and against whom should he proceed ?

8. (*a*) What is the extent of the rights of
to dower over her deceased husband's proper
brother, (2) in her own possession, (3) in the h
for value ?

(*b*) *A*, a Mahomedan, makes a will and leave
to his father *B*. His wife attests the wil
childless. On the wife's death her brother
property from *B*. How will you decide the d

9. (*a*) What are the rights of a widower
( ) the Mahomedan Law, (2) the Indian Su
Succession Act ?

(*b*) A Mahomedan widow dies leaving a d
two illegitimate sons of her sister. How will
amongst these persons ?

10 (*a*) Under what circumstances can prol
a will when the original exists ?

(*b*) A Hindu testator bequeathes a fund to h
after her death to her daughters. At the tim
sister had two daughters, and two more were
Is the bequest valid ?

TUESDAY, 18TH J
[2-30 P.M. TO 5-3

PROPERTY, EASEMENTS, I

1. Mention the kinds of property which m
Transfer of Property Act.

A transfers his right to sue for damages for
transfer good ?

2. Distinguish between a vested and a con
this distinction operate upon the devolution of

A, a Hindu widow, institutes a suit for

(i) arrears of maintenance due under a

(ii) a declaration of her right to receive

A dies during the continuance of the suit.
suit and, if so, to what extent ?

3. Explain the rights and liabilities of a se
under the Transfer of Property Act.

Can a seller refuse to give possession on the
money has not been paid if the contract is oth

4. How does the Transfer of Property A
tinguish a 'mortgage by conditional sale' fr
repurchase ?

5. Explain the conditions essential for a valid deposit by a mortgagor. What is the legal effect of such a deposit? 8

A mortgagor deposits the mortgage money into Court which the mortgagee refuses to accept. The mortgagor subsequently withdraws it after the refusal. What is the effect of such a deposit and withdrawal?

6. Who are entitled to redeem? 8

What is the position of a purchaser at a Court sale of a first mortgagee's interest as against the mortgagor and as against subsequent mortgagees?

7. Define a 'lease', and explain the modes in which leases may be created under the Transfer of Property Act. 8

Can an instrument duly registered, but not signed by the lessor be considered a lease?

8. Define an 'easement', and explain the terms 'continuous', 'discontinuous', 'apparent' and 'non-apparent' easements. 6

9. What are the limitations upon the powers of a 'dominant owner' regarding the exercise of his rights under an easement? 10

10. What steps are necessary for a person to take up unoccupied lands and what are the penalties for an unauthorized occupation? 10

Explain briefly the position of an occupant on alienated and unalienated lands.

11. Explain the combined effect of the Revenue Jurisdiction Act and the Land Revenue Code upon suits brought against the Secretary of State. 8

A institutes a suit in a Civil Court against the Secretary of State for an unauthorized attachment of his goods lying on his own land by a Government servant. The Government object on the ground that all the remedies under the Revenue Laws were not exhausted by the plaintiff. Is the objection good? What would be your answer if the plaintiff proves that he had filed the Revenue appeals, but did not wait for the decisions?

12. Mention the documents which must be registered under the Indian Registration Act, and state the effect of non-registration. 12

Which of the following documents require registration and why?

(*a*) An agreement for the reduction of rent under an existing lease.

(*b*) A document varying the amount of rent under a previously existing lease as also the incidents of such payment.

(*c*) An agreement to execute a sub-lease and to get it registered at a future date.

WEDNESDAY, 19TH JUNE.

[2-30 P.M. TO 5-30 P.M.]

EQUITY.

N.B.—Candidates should always give reasons for their answers.

1. Explain clearly:—

Settled account.
Administrator pendente lite.
Precatory trust.

2. State the facts and explain the principles laid down in the following cases:—

Ellison *vs.* Ellison.
Pussey *vs.* Pussey.
Keech *vs.* Sandford.

3. Explain and illustrate by examples the following maxims :—

Delay defeats equity.
Equity follows the law.
Delegatus non potest delegare.

4. (*a*) "An equity of redemption is a right not given by the terms of the agreement between the parties to it, but contrary to them."

(*b*) "Any agreement making such right of redemption more burdensome is void."

(*c*) "It is a very dangerous thing at any time to buy equities of redemption or to deal with them in any way."

Explain and illustrate these statements.

5. Define the equitable doctrine of *election*. What general principles could be laid down to render an election valid ?

A testator gives to *A* Rs 10,000, and to *B* a house of small value to which *A* is entitled. If *A* refuses to give up his own property, will he absolutely forfeit the benefit given him by the will ?

6. Under what circumstances is notice to an agent constructive notice to his principal ?

A man acts as secretary of two different companies. Is a fact which comes to his knowledge as secretary of one company notice to him as secretary of the other company ? Give reasons for your answer.

7. Explain and illustrate the three certainties required for constituting a trust.

Explain and illustrate the rule that: "once a trust is fully constituted, it can be enforced against the settlor by any cestui que trust, whether he gave or did not give value for the trust."

Are there any exceptions to this rule ?

8. Under what circumstances will the right to contribution towards loss through breach of trust as between co-trustees be, and be not, recognized by the Courts ?

9. (*a*) What are the requirements for a suit under the *Specific Relief Act* by a person dispossessed of immovable property ?

(*b*) Will such a suit lie by plaintiff alleging to be in possession on behalf of his father who is alive, but not a party to the suit, and dispossessed by the defendant ?

(*c*) A mortgagee who has been dispossessed by the mortgagor brings a suit under section 9 of the *Specific Relief Act* for possession against him. The mortgagor alleges that the mortgage and the possession under it were obtained by the fraud of the mortgagee. Is this a good defence ?

10. (i) *A's* widow was sole trustee of *A's* estate consisting of a business under a trust to convert and invest the proceeds in recognized securities, and hold the same in trust for herself for life and then for *A's* children. The widow finding that to wind up the business would greatly decrease the income from the estate determined to continue it. *B* and *C* agreed to assist her in so doing, and a banking account consisting of trust moneys was opened upon which the widow alone was entitled to draw, but her cheques had to be initialled by *B* and *C* before they were honoured. *B* and *C* were aware that carrying on of the business by the widow was a breach of the trust ; they received no remuneration, and there was no suggestion of fraud against them. Many bills were paid with such cheques. Ultimately the business proved a failure, and the estate was distributed in payment of business debts. The children bring a suit against *B* and *C* claiming a declaration that *B* and *C* were liable to repay all money other

than for the purposes directed by the trust, and that they were liable for all the estate employed in the business. How far will the children succeed?

(ii) *A* settles property on *B*, a living person for life, with remainder to his unborn son for life, with remainder to his unborn grandson absolutely. What interest do *B*, his son and grandson take (*a*) under the Indian law, (*b*) under the English law?

(iii) A trustee is made a director of a company, his qualification and the ground of his appointment being shares in the company which he holds as trustee. Can he retain for himself the fees which he receives as director?

THURSDAY, 20TH JUNE.

[2-30 P.M. TO 5-30 P.M.]

EVIDENCE, CIVIL PROCEDURE AND LIMITATION.

N.B.—Candidates should always give reasons for their answers. Answers to the three sections to be written in separate books.

SECTION I.

1. (*a*) What decree will you pass in a foreclosure suit? 10

(*b*) In execution of a decree of the Court at Poona, a house belonging to the judgment-debtor was attached by the Court at Belgaum, and ordered to be sold. An appeal from the decree is pending and the judgment-debtor comes to you for advice. What advice will you give him?

2. State the procedure to be followed in the following cases:— 13

(1) when execution is applied for by a transferee of the decree;

(2) when a judgment-creditor wishes to proceed against the legal representative of the judgment debtor;

(3) when the decree of which execution is sought is more than a year old;

(4) when the judgment-debtor's objection to the attachment of the property in his possession as a Trustee is overruled.

3. (*a*) How and under what circumstances can an aggrieved party obtain the reversal of an erroneous decree in a case in which no appeal is allowed by law? 12

(*b*) State briefly the procedure to be followed in the following cases:—

(i) when a person wishes to sue or appeal in *formâ pauperis*;

(ii) when a defendant wishes to have discovery of documents in the possession of the plaintiff.

4. (*a*) When can a Court appoint a Receiver? Can a Receiver be appointed after decree? State what are the duties of a Receiver and how they may be enforced. 10

(*b*) Two undivided Hindu brothers who have not effected partition of the family property live in two different houses for mutual convenience. One of them dies childless. The other has one son of fourteen years of age and a daughter three years old. The widow of the deceased brother wishes to file a suit for maintenance. Draw a plaint on these facts.

SECTION II.

5. Distinguish between:— 10

Res judicata and Estoppel.
Expert evidence and Ordinary evidence.
Ambiguity and Inaccuracy.
Admissibility and Relevancy.
Disproved and Not proven.

6. (i) In what way can the credit of an adversary's witness be impeached?

(ii) Under what circumstances can a witness refresh his memory from a writing (*a*) made by himself, (*b*) made by another? Can he do so from a document which is inadmissible in evidence as not being duly stamped?

(iii) What is meant by proving a document? How are wills proved?

7. (i) Discuss the safeguards which the Legislature has provided in order to make confessions admissible.

(ii) From what questions will a witness be excused or protected by the Court?

(iii) Under what circumstances is a deposition of an absent witness admissible?

(iv) In a suit on a bond, *A*, an attesting witness, deposes to his having attested the bond. Subsequently the bond is found to be forged, and *A* is prosecuted for abetting the forgery. Can his deposition in the civil suit be proved against him in the criminal trial?

SECTION III.

8. Mention briefly the periods of time which are excluded in computing the periods prescribed by the Indian Limitation Act for suits, appeals and applications.

9. Are the following suits in time?

(i) *A* holds a mortgage bond dated 4th March 1897 against *B* who is an agriculturist. *A* applied to the conciliator for a certificate on 15th June 1910, obtained the certificate on 8th August 1910 and filed a suit for recovering money under the bond on 10th August 1910.

(ii) *A* sues *B* in 1890 for recovery of possession of certain immovable property, alleging that *B* had taken wrongful possession of the same in 1882. *B* admits his possession since 1882, but says that he was adopted by the last holder in 1882. *A* denies the *factum* of the adoption as well as its legality.

(iii) *A* deposited Rs. 500 with a banker in 1860 and died in 1870 without claiming the deposit. In 1875 *A*'s heir brings a suit for recovering the amount with interest.

EXAMINERS.

T. M. KAJIJI, M.A., LL.D.
J. R. GHARPURE, B.A., LL.B.
SITARAM S. PATKAR, B.A., LL.B.

MONDAY, 25TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

SUCCESSION AND FAMILY RIGHTS.

N.B.—The answers to questions on Hindu Law may be chiefly confined to the Bombay School of the Law. Candidates should always give reasons for their answers and cite cases.

1. State the basic principle of a joint tenancy as distinguished from a tenancy-in-common under Hindu Law. State the nature of the estate whether joint tenancy or tenancy-in-common in the following cases:—(*a*) gift of a house to two brothers living in union as members of a joint

family; (*b*) property inherited by the sons from their mother; (*c*) property inherited from a maternal grandfather by grandsons (by the same daughter) living as members of a joint family; (*d*) daughters succeeding to the stridhan of their mother.

2. Discuss the limits of the rule of Hindu Law that no one can be adopted whose mother the adopter could not have legally married. When does the power of widow to adopt come to an end so as to be incapable of being revived? 14

A, *B*, and *C*, three brothers, effected a partition of property consisting of Deshpande Vatan. The vatan was divided into three takshims. *A* had a son *D* and a grandson *E*, and *C* had a son *F*. *D* after the birth of his son *E* was adopted by *B*. *D* after his adoption made a will bequeathing his takshim of the vatan in favour of his son *E* born to him before adoption and died leaving behind him his widow *G* and a daughter *H*, and cousin *F*, and son *E* born before adoption. A posthumous son *K* was born to *D* and died after two years. *G*, the widow of *D*, now wishes to adopt a minor son and make a provision for her daughter *H* by making a gift of one of the Vatan lands and wishes to impose conditions on the adopted son by entering into an agreement with the natural father of the minor boy. *E* opposes on the ground that he had a right to the property by devise. *F* opposes on the ground that the will in favour of *E* is invalid and he is the heir of *K* under the Vatan Act. What advice will you give to *G*, the widow of *D*, as to her right of adoption and her power of imposing conditions on the adopted son and as to the rival contentions of *E* and *F*?

3. Discuss generally the liability of the sons to pay the debts of their father under Hindu Law, and specially in the following cases—(*a*) father's liability arising under a tort committed by him by obstructing the water-course of another person; (*b*) father's liability as surety for a debt; (*c*) misappropriation by father amounting to a criminal offence. 10

What is the effect of Bombay Act VII of 1866 on the son's liability?

4. Contrast the rules of Hindu and Mahomedan Law with respect to (*a*) maintenance of wives, (*b*) revocation of gifts, (*c*) effect of apostacy on the marital tie. 10

5. How far does a Hindu widow represent the estate of her deceased husband? Is it necessary for a reversioner to set aside the alienation by a Hindu widow before suing for possession? What is the effect of the consent of the reversioners to the alienation by the widow? Discuss the doctrine of the power of the widow of accelerating, by surrender of her own, the interest of the next reversioner. How far is a reversioner liable for debts contracted by a Hindu widow for a necessary purpose in the absence of a specific charge? 12

6. State the different kinds of technical stridhan. Discuss the limits of the woman's power of disposal over her stridhan during coverture by gift or bequest. What would be the nature of the estate allotted to a Hindu mother at the time of the partition between her sons and how would it devolve on her death? 12

A Hindu woman died possessed of stridhan property called Anvadheya gift subsequent to marriage) leaving a son, an unmarried daughter and a married daughter. Who would be entitled to the inheritance according to Mitakshara and Mayukha?

7. (*a*) State the different forms of divorce under the Mahomedan Law and the different modes in which they are effected and state the rights and obligations arising on the dissolution of a contract of marriage by divorce. 10

(*b*) A woman dies leaving her husband, mother and a daughter. How would you distribute her property under the Mahomedan Law, Parsi

8. State the necessary forms to be observed for claiming a right of pre-emption under the Mahomedan Law. 10

A, *B* and *C* are co-sharers in certain lands. *A* sells his share for Rupees 1,000 to *B* and *S*. It is declared in the sale deed that two-thirds of the share is to be for *B* and one third for *S*. Can *C* claim pre-emption in the whole or any part of the share sold? Would it make any difference if the price paid by each had been specified in the deed?

9. (*a*) How far does the doctrine of satisfaction that a legacy in the will is no more than a payment of the deposit or debt apply to the testamentary disposition of a Khoja Mahomedan? 10

(*b*) Write short notes on (1) Ademption of legacy.
(2) Executor de son tort.
(3) Refunding of legacies.

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

PROPERTY, EASEMENTS AND LAND TENURES.

N.B.—Reasons should be given for each answer and cases should be cited.

1. Define "an actionable claim" under the Transfer of Property Act. 10

Are the following actionable claims?

(1) The right to claim the benefit of the enforcement of certain conditions under a contract for the purchase of goods.

(2) A Decree of a Civil Court.

2. (*a*) Describe the legal results of a transfer under the Transfer of Property Act. 10

(*b*) State the rule against accumulations and mention the exceptions, if any, to that rule.

3. State the doctrines of *marshalling* and *contribution* and distinguish between the two. Can a vendee of immoveable property claim the benefit of any of these against prior incumbrancers, and if so, to what extent and under what circumstances? 10

4. Properties *A* and *B* belong to *P* and both were mortgaged to *X* in 1894. In 1900 *Y* purchased the property *B* at an auction sale held in execution of a money decree against *P*. *X* brings a suit on his mortgage in 1905 and makes *P* and *Y* the defendants. Advise *Y*. 10

5. Discuss fully with reference to decided cases the position of an owner of a charge or other encumbrance on immoveable property when he becomes absolutely entitled to such property. 10

(*a*) Land belonging to *A* was first mortgaged to *B*, then it was charged under a registered decree passed in favour of *C*, and subsequently it was mortgaged in favour of *D* who paid off *B*'s mortgage. What are the rights of *D* and *C*?

6. Define a "lease" and distinguish it from a "license". 10

In 1860 *A* allows *B* to build a house on his land and *B* executes an agreement whereby he undertakes to remove the building whenever required to do so. *A* died in 1865 and in 1900 *A*'s son *C* brings a suit to evict *B*. Advise *B*.

7. Write short notes on the following tenures, describing the incidents of each: 10

8. (*a*) What is the extent of a Vatandar's power of alienation of a property which is Vatan? 10

(*b*) What are the penalties provided for by the Vatan Act for the misconduct of a Vatandar?

(*c*) Under what circumstances may a deputy be appointed in the place of a representative Vatandar?

9. (*a*) Explain the term "Land-Revenue" and state on what lands is it chargeable under the Land Revenue Code. 10

(*b*) What are the powers of the Collector when failure in payment of Land Revenue occurs?

(*c*) What do you understand by the term Local Fund Cess and how is it assessed?

10. How are Easements acquired by prescription? 10

Enumerate the rights which cannot be so acquired.

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

EQUITY.

1. State the facts and explain the principles laid down in the following cases:— 9

   (*a*) Robinson *v*. Pett.
   (*b*) Russell *v* Russell.
   (*c*) Woollam *v*. Hearn.

2. (*a*) Write explanatory and historical note on the following passage:— 9

"Equity is a roguish thing. For law we have a measure. . . . equity is according to the conscience of him that is chancellor, and as that is larger or narrower, so is equity. 'Tis all one as if they should make the standard for the measure a chancellor's foot."

(*b*) Explain the statement that "a puisne mortgagee may foreclose without redeeming but he cannot redeem without foreclosing."

3. (*a*) Contrast the equitable remedy by account with the legal remedy in damages. 8

(*b*) *A* owned and worked the minerals under *B*'s land. As a result of the working *B*'s surface was let down and further subsidence was threatened. *B* sued *A* for an injunction and damages. The Court refused the injunction and gave damages only. On what principle will the damages be assessed if when *B*'s suit was commenced the working (i) was being continued, (ii) had ceased?

4. State the rule in Shelley's case. Does the rule apply to— 8

(*a*) A grant of land to *A* for life, with remainder to his wife for life, with remainder to the heirs of *A*?

(*b*) A gift of land to *A* for life, with remainder to his eldest son and heirs of his body?

(*c*) A gift of land in a will to trustees on trust to settle the land upon *A* and the heirs of his body in succession?

5. (*a*) Explain the object and effect of the following clause contained in conditions of sale of land:—"If any objection or requisition shall be made and insisted on, which the vendor shall be unable or unwilling to remove or comply with, then, notwithstanding any intermediate negotiation or litigation, the vendor shall be at liberty by notice in writing to rescind the sale." 11

(*b*) State the effect of the hotchpot and advancement clauses usually inserted in a Deed of Settlement. Give illustrations showing the expediency of inserting the clauses.

6. (*a*) "Where a question of election arises, compensation, not forfeiture, is the rule of the court." 6

Explain this, with examples.

(*b*) How does the doctrine of election apply to appointments under special powers?

7 (*a*) Attempt a definition of a power, distinguishing it from "ownership" and "trust". What is meant by— 11

(1) a common law power,
(2) an equitable power?

(*b*) What is an executor's right of preference, and by what means, if any, may the exercise of that right be prevented?

8. (*a*) In what kinds of cases and how may an injunction be — 12
(i) the instrument by which a contract is specifically enforced,
(ii) ancillary to specific performance of a contract?

(*b*) In what classes of cases, and on what principles, may the specific performance of a contract be successfully resisted on the ground of (i) hardship, (ii) mistake, and (iii) inadequacy of consideration?

9. (*a*) Under what circumstances, if at all, can a trustee validly purchase property subject to his trust? 11

(*b*) A trustee is about to invest trust money on a mortgage of real estate. Advise him as to his possible liability for any loss to the trust estate and as to how he can protect himself.

(*c*) State the requisites of a valid Charitable Trust, and explain the doctrine of *cy-près*.

10. (*a*) On January 1, 1912, *A* having at that time no funds to his credit at his bank, sells securities he holds in trust for *X* for Rs. 10,000, which sum he pays into his private account. In February he pays in a further sum of Rs. 5,000, being money belonging to himself. In March he draws Rs. 10,000 which he applies to his own use. Subsequently he becomes insolvent. Who is entitled to the Rs. 5,000, still standing to *A*'s credit? Would it make any difference if the Rs. 5,000, paid in in February, had been money held by *A* in trust for *Y*? 15

(*b*) Under a marriage settlement funds were held in trust after the deaths of *A* and *B* (the husband and wife) for any of their children as they should appoint, and in default of appointment for their children equally. They had two sons and a daughter. The daughter having died leaving children, *A* and *B* appointed all the funds to their elder son, on a verbal bargain between them and him that he should resettle the funds in trust for himself for his life, and subject thereto for his sister's children. Was the appointment valid or invalid wholly or partially, and why?

(*c*) (i) *A* gave to *B* a bond to secure payment to *B* of Rs. 20,000 within six months after *A*'s death, and subsequently by his will directed his debts to be paid and bequeathed Rs. 15,000 to *B*. (ii) *A* bequeathed Rs. 5,000 to his elder brother *B*, and appointed him executor, and died owing him an interest-bearing debt of Rs. 4,500 payable on demand, the interest on which debt had been paid up to *A*'s death.

What did *B* take in each of the above cases, and why?

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

CIVIL PROCEDURE, EVIDENCE, LIMITATION.

N.B.—Candidates should always give reasons for their answers. Answers to the three sections to be written in separate books.

SECTION I.

1. (*a*) Define Substituted Service. What is its effect? 1

(*b*) A summons was forwarded to the defendant in a registered packet through the Post Office, and the packet was returned endorsed "*refused*". Is this service good or defective? If defective, in what way?

(*c*) Discuss the various remedies open to defendants, when an *ex-parte* decree is passed against them or one of them.

2. (*a*) In what actions may payment into Court be made by a defendant? At what stages in a suit may such payment be made? In what suits is a defendant not allowed to pay into Court when pleading a denial of liability? When can a plaintiff take out of Court the money paid in? 1

(*b*) Define and distinguish:—

(i) An affidavit of documents.
(ii) A notice to produce documents.
(iii) A notice to inspect and admit documents.

What useful purpose is served by each of them?

3. (*a*) Distinguish "Particulars" from the "Answers to Interrogatories". What steps must a party take to obtain each of these? 1

(*b*) What is the distinction between an amendment of a decree and a review of judgment, especially as regards the occasions or reasons for granting them, the powers of Judges and their successors to grant them, the limits upon their repetition and the periods of limitation for applying for them?

4. (*a*) *A* and *B*, who were partners in a firm, engaged *C* to be their cashier at the salary of Rs. 1,200 a year, payable quarterly. In the middle of a quarter, *A*, in the presence of *B*, charged *C* with misappropriation, and dismissed him from his post. *C* indignantly denied the charge, and refused to leave the counting house. *A* then sent for a policeman, who forcibly expelled *C* from the premises. 1

C desires to claim damages from the firm for wrongful dismissal and from *A* for slander and assault. Can these claims be joined in the same suit? Draw an appropriate plaint.

(*b*) Draw a written statement to the plaint which you have drawn in your answer to the above question, on the assumption that *A* is now satisfied that *C* had not misappropriated any money belonging to the firm, but that *C* had kept the books so negligently that there were at first sight good grounds for believing that he had misappropriated certain items.

SECTION II.

5. How far are judgments not *inter partes* admissible in evidence? How far is evidence of subsequent conduct and oral evidence proving a contemporaneous agreement admissible to prove that a document in form a sale-deed is in reality a mortgage?

6. State the rules laid down by the Indian Evidence Act with respect to (1) impeaching the credit of witnesses, (2) privilege of professional communications. How far is a statement taken in writing of a witness on behalf of the prosecution and recorded by a police officer under section 162 of the Criminal Procedure Code admissible in evidence against the accused? 10

7. State the rules laid down by the Indian Evidence Act with respect to estoppel. Can a mortgagee deny the title of the mortgagor? Can estoppel by conduct validate a marriage which is invalid under Hindu Law? How far is representation relating to a promise *de futuro* binding as an estoppel? 10

8. Distinguish between primary and secondary evidence and state the circumstances under which secondary evidence is admissible. 7

SECTION III.

9. Discuss the conditions under which (*a*) an acknowledgment and (*b*) payment in part, serve to extend the period of limitation. 10

10. Are the following suits in time:— 10

(*a*) *A* sues to redeem a mortgage more than 60 years after the due date, but relies upon an acknowledgment by one of the joint-mortgagees made before the expiry of 60 years?

(*b*) *A*, a mortgagee, brings a suit upon his mortgage under section 31, of Act IX of 1908, but files the plaint on Monday, the 8th August 1910?

(*c*) A suit by a religious trustee to recover trust property which had been alienated more than 12 years before suit by the plaintiff's predecessor in title who had granted a permanent lease in commutation for a fixed rent and on the payment of a fine?

(*d*) A suit by an unpaid vendor to enforce his charge on the land for the unpaid purchase money?

X.

EXAMINATION FOR THE DEGREE OF MASTER OF LAWS.

(BRANCH II.)

EXAMINERS.

DINSHAH F. MULLA, M.A., LL.B.

M. R. JAYAKAR, M.A., LL.B.

MONDAY, 25TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

HINDU LAW—PAPER I.

1. State the salient features of ancient Hindu jurisprudence as distinguished from modern European systems. 10

2. State briefly the rules of pleading and evidence known to the Mitakshara, pointing out their resemblance, if any, to British Indian rules in that behalf. 12

3. Mention the texts which indicate that notions of the laws of limitation, agency, adverse possession, appellate jurisdiction, treasure trove, suretyship, attestation, and succession *per stirpes*, were known to ancient Hindu Law. 20

4. Comment on the statement, giving instances, 10

"the difference between self-acquired and ancestral property was unknown to ancient Hindu Law."

5. Comment on the statement "the power of a Hindu father over his wife and children was limited in ancient Hindu Law, and did not amount to ownership". 8

6. State the law relating to "gains of science," tracing the different stages through which it has passed, and give your opinion as to whether and how legislation should modify the same. 15

7. Comment on the statement 10

" the adoptd son must be a reflection of the natural born son."

8. Criticize the statement that a devise to "Dharam" is void. 15

MONDAY, 25TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

HINDU LAW—PAPER II.

1. State what developments have taken place in the rules of modern Hindu Law, based on the following ancient texts :— 20

(*a*) The father is the owner of all jewels, pearls, and corals.

(*b*) Sons and grandsons should pay the debts.

(c) Married brothers should get their unmarried sisters married by giving them a quarter share.

(d) Partition is but a particular condition of the mind.

2. Trace the development of the Law of Stridhan, mentioning the changes introduced therein by Yájnavalkya, the Mitákshará, the Mayúkha, and the Privy Council. 15

3. State the position in Hindu Law, with regard to succession, of the following persons, mentioning the texts on which it is based:— 10

(a) sister;
(b) brother's grandson;
(c) daughter's son.

4. Mention the rules governing the validity of agreements made between the adoptive and genetive parents of the adopted son relating to his rights of inheritance on adoption. 10

5. What are mandatory and directory texts? Give three instances of each; and mention some of the rules which govern their interpretation. 15

6. Comment on the statement— 1

"The head of a *Muth* in Hindu Law is a corporation sole."

7. State the view of the Datt Chandriká as regards the rights of an adopted son on partition with the collaterals of his father. Comment on the validity of the said view. 10

8. Comment on the statement "the tendency of modern decisions is to regard, more and more, the power to give a son in adoption as belonging to the *patria potestas* of the parents". 10

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

MAHOMEDAN LAW—PAPER I.

1. *A*, a Shiah Mahomedan, has a son *B* and a daughter *C*. On the date of *C*'s marriage the following documents are executed one after another:—

i) a deed purporting to be a deed of gift of Rs. 5,000 by *A* in favour of *C*;

(ii) a deed purporting to be a release by *C* of her right of inheritance to the estate of *A*;

(iii) a deed of settlement by *C* by which she purports to transfer the said sum of Rs. 5,000 to *A* as a trustee upon trust to pay the income thereof to *C* for life and to divide the surplus after her death among her children.

Pursuant to the last deed *A* pays the income of Rs. 5,000 from time to time to *C*. *A* then dies leaving *B*, *C*, and *C*'s son *D*. *C* sues *B* and *D* to recover her share of the property left by *A*, and for a declaration that neither the release nor the deed of settlement is binding on her. What are the rights of *B*, *C*, and *D*?

2. State the provisions of the Sunni and the Shiah Mahomedan Law relating to gifts of *mushaa*.

3. A Mahomedan transfers a sum of Rs. 15,000 and a house worth Rs. 7,000 to certain persons as trustees with directions to them to apply the net income towards the following purposes :—

(i) for reading the Koran at his grave ;

(ii) for maintaining his tomb ;

(iii) for celebrating his *barsi* (anniversary of his death) ;

(iv) for performing the annual *fatiha* of his deceased parents.

Are the trusts valid ?

4. A Shiah Mahomedan dies leaving a son and a brother. By his will he bequeaths his property, which is ascertained to be worth Rs. 40,000, as follows :—

(i) Rs, 10,000 to his son ;

(ii) Rs. 0,000 to his brother ;

(iii) Rs. 10,000 to a friend of his ;

(iv) Rs. 10,000 to charity.

Are the legacies valid, and, if so, to what extent ? Would it make any difference if the deceased was a Sunni ?

5. A Mahomedan marries a Christian woman, the marriage being solemnized according to Mahomedan rites. He then dies leaving the said woman and a brother. Who is entitled to his property ?

6. In what cases does an acknowledgment by a Mahomedan of another person as his child entitle the child to inherit to the acknowledger ?

7. A Mahomedan dies leaving a widow and a minor son. After his death the widow mortgages her husband's property, and pays off his creditors with moneys borrowed from the mortgagee. Is the mortgage binding on the son ?

8. The heirs of a deceased Mahomedan sell his property and divide the purchase-money among themselves. Subsequently a creditor of the deceased obtains a decree against the heirs, and applies for attachment of the property in the hands of the purchaser. Is he entitled to attach the property, and, if so, in what cases ?

9 A Mahomedan dies leaving two sons by a daughter's son and a son and two daughters by a daughter's daughter. To what shares are they entitled ?

10. What are the points of distinction between the Sunni and the Shiah law of pre-emption ?

By what law is the right of pre-emption to be determined if the vendor as a Shiah and the pre-emptor a Sunni ?

TUESDAY, 26TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

MAHOMEDAN LAW—PAPER II.

1. A Mahomedan while suffering from *Marz-ul-maut* disposes of one-third of his property by gift, another third by will, and he gives the remaining third to the trustees of a certain charity. How far are these dispositions valid ?

2. A Sunni Mahomedan executes a deed of trust whereby he transfers his property to certain persons as trustees to hold the same upon the following trusts :—

(1) to pay the income thereof to the settlor for the maintenance of himself and his family till his son *A.B.* attained the age of 21 years ;

(2) in the event of *A.B.* attaining the age of 21 years, the trustees to transfer the property to the settlor and *A.B.* jointly ;

(3) if *A.B.* died before attaining the age of 21 years, the trusts to come to an end as if no deed was executed.

Some time after the execution of the said deed the settlor sells the property to *C.D.* *A.B.* attains the age of 21 years, and brings a suit against his father, the trustees and *C.D.*, for a declaration that he is entitled to a moiety of the property. What are the respective rights of the parties ?

3. State which of the following estates are recognized by either the Sunni or Shiah Mahomedan law :—

(*a*) an estate for life ;

(*b*) a vested remainder ; and

(*c*) a contingent remainder.

4. *A*, a Sunni Mahomedan, executes a deed of gift whereby he gives to *B* the whole income of a certain immoveable property belonging to him till *A*'s death. The deed does not contain any further dispositions of the property. Is the gift to *B* a valid gift ?

5. A Sunni Mahomedan executes a deed whereby he transfers certain immoveable property worth Rs. 50,000 and realizing an income of Rs. 2,500 per annum to certain persons as trustees upon trust to pay one-tenth of the income to his daughter and her descendants from generation to generation, and the remainder to charity. Ten years after the date of the deed the settlor dies leaving a brother and his said daughter. The daughter dies next leaving a son. Fifteen years after the date of the deed the daughter's son institutes a suit against the trustees and the settlor's brother for a declaration that the deed is void, and that he is entitled to the whole of the property as the heir of his mother. The brother contends that he is entitled to the property as the heir of the settlor. The trustee contends that the deed is valid, and if it is held to be invalid as to any portion thereof, that the claim of both the daughter's son and the brother is barred by the law of limitation. How would you decide the case ?

6. (*a*) Name the sharers who inherit under certain circumstances as residuaries.

(*b*) Name the heirs who are always entitled to a share of inheritance, either as a sharer or as a residuary.

(*c*) If a Mahomedan dies without leaving any son but leaving a son's son, what other relations must he leave him surviving so as to exclude the son's son altogether from inheritance ?

Answer the question with reference to Sunni law.

7. A Shiah Mahomedan dies leaving a father, a daughter, a mother, and two full brothers. In what shares would you divide his estate ?

WEDNESDAY, 27TH NOVEMBER.

[10-30 A.M. TO 1-30 P.M.]

THE LAW OF WILLS.

1. State the extent of the testamentary power of a married Hindu woman in the Bombay Presidency over property inherited by her from her father.

2. What are the conditions necessary to the validity of bequests made to unborn persons in cases governed by the Indian Succession Act?

3. (*a*) A childless Hindu disposes of his self-acquired property by will. Is the will revoked—

(*i*) by the subsequent adoption by him of a son;

(*ii*) by the birth of a posthumous son to him?

Would it make any difference if the will was one made by a sole surviving coparcener governed by the Mitakshara law, and the property disposed of by the will was coparcenary property?

(*b*) Is the will of a Hindu revoked in any case by his marriage?

4. A Hindu testator bequeaths his property to such persons as *A* may by his (*A*'s) will appoint. State the limits within which the power can be effectually exercised by *A*.

5. A Hindu, governed by the Hindu Wills Act, bequeaths his property to his three sons *A*, *B* and *C* in equal shares, and directs that in the event of any of his sons dying without sons, his share should pass over to the sons then living All the three sons survive the testator. One of the sons, *A*, dies leaving a widow, but without leaving any sons. Who is entitled to *A*'s one-third share of the property?

Would it make any difference if the case was not governed by the Hindu Wills Act?

6. By what law is the construction of the wills of Khoja Memons governed?

A Khoja Memon bequeaths the whole of his property to his son, with a condition that if the son died before attaining the age of 21 years and without leaving a will, the property should go to charity. The son dies before attaining the age of 21 years and without leaving a will. On the death of the son his uncle claims the property as his heir. Who is entitled to the property?

7. State, giving reasons, which of the following bequests are valid and which are void:—

(*a*) a bequest of Rs. 5,000 by a Shiah Mahomedan to one of his daughters. The testator dies leaving three daughters and property worth Rs. 14,000;

(*b*) a bequest of Rs. 1,000 by a Shiah Mahomedan to *A*, and another bequest also of Rs. 1,000 to *B*. The testator dies leaving three daughters and property worth Rs. 3,000;

(*c*) a bequest of Rs. 500 by a Sunni Mahomedan to his brother. The testator dies leaving a son and property worth Rs. 2,000;

(*d*) a bequest by a Hindu to such girl as his son may marry;

(*e*) a bequest by a Hindu to an idol not yet installed.

WEDNESDAY, 27TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

THE LAW OF MARRIAGE AND SUCCESSION IN BRITISH INDIA.

1. Discuss the merits of what is known as the Harrington scheme of succession in Hindu Law, as opposed to its rival systems. 10

2. Comment on the statement, giving exhaustive instances, "the Mitâksharâ scheme of succession is more natural than the Dâya-Bhâga". 15

3. State the position of ancient Hindu Law with regard to inter-caste marriages, and point out how the same has been affected by modern decisions. State whether and how legislation should modify the same. 15

4. State briefly the *principles* governing intestate succession among Parsees, and contrast the same with the provisions of the Hindu Law in that behalf. 10

5. State and explain the principle known as the "rule against perpetuities". Mention how far the said principle is in conformity with the rules of ancient Hindu Law, and how far it ought to find a place in Indian Law. 15

6. Explain the *principles* on which the following rules of law, as laid down in the Indian Succession Act, are based :— 15

   (*a*) A power of appointment must be taken to be executed by a general bequest.

   (*b*) A direction for accumulation of income is bad.

   (*c*) A bequest to the testator's lineal descendant does not lapse on his death during the testator's life-time.

7. Comment on the statement :— 10

"Guardianship for the marriage of maidens is a duty and not a right in Hindu Law."

8. State how far the ancient Hindu Law rules relating to prohibited relations for marriage are followed in practice at the present date. 10

EXAMINERS.

BRANCH IV.

RUSTAM K. R. CAMA, B A., LL.B.

DINSHAH F. MULLA, M.A., LL.B.

MONDAY, 25TH NOVEMBER.
[10-30 A M. TO 1-30 P.M.]

LAW OF CONTRACTS.

1. In what cases is time of the essence of a contract, and in what cases is it not? Has the nature of the property sold under a contract any bearing on the question as to whether time is of the essence of the contract? Can time be made of the essence of a contract by notice? Discuss the question with reference both to the English and the Indian law on the subject.

2. State what was decided in—

Lumley v. *Wagner* (1852), 5 De. G. S. 485.

Is there any corresponding provision in the Anglo-Indian Codes?

3. The guardian of a minor enters into an agreement with *AB* to purchase certain immoveable property for the minor. After the minor attains majority *AB* sues him for specific performance of the contract. Are there any defences which the defendant can successfully raise against *AB* ?

4. *A*, a Hindu, pays Rs. 1,000 to *B* as consideration for *B*'s promise to marry his daughter to *A*'s son, and agrees to pay to *B* a further sum of Rs. 1,500 on the celebration of the marriage. *A*'s son dies before the marriage could take place. Is *A* entitled to recover back Rs. 1,000 already paid to *B*? Is there any section of the Indian Contract Act bearing on the point ?

5. A policy of insurance against fire reserves to the insurers the election to reinstate the insured premises instead of paying for the damage. The premises are destroyed by fire, and the insurers give notice that they would reinstate the premises. The premises are subsequently pulled down by the Municipality as being in a dangerous condition but not attributable to the fire. The insurers thereup refuse to reinstate the premises, and offer to pay for the damage. Are they entitled to do so ?

6. State the rules of English law relating to accord and satisfaction. Have these rules been reproduced in the Indian Contract Act, and, if so, to what extent ?

7. By what law is the capacity of a person to enter into a contract governed, where the contract is an ordinary mercantile contract, and where it is one relating to immoveable property ?

A, a man of 20, is domiciled in England. When in Bombay he incurs a debt for the price of jewels sold to him. An action is brought for the debt in England. Is he liable for the price ?

8. *A* is appointed receiver of the estate of a deceased person with power to carry on the business for the purpose of winding it up. In the course of such business *A* incurs debts which are not alleged to be improper. Is the creditor entitled to sue the administrator of the estate of *A* for the recovery of the debts? Is he entitled to be paid in priority to other creditors of the estate ?

9. What is the measure of damages payable to the buyer in each of the following cases :—

(*a*) where the buyer does not press the seller for delivery on the due date, and then after a few days goes into the market and buys at an advanced price ;

(*b*) where the subject-matter of the contract is not marketable ;

(*c*) where the seller is given an option to deliver the goods in August *or* September, and he gives notice to the buyer in the middle of August that he will be unable to perform the contract, and the buyer treats the refusal as an immediate breach.

(*d*) where the contract is for delivery in August *and* September, and the seller gives notice as in case (*c*) above.

10. In what cases is a contract made on behalf of a company registered under the Indian Companies' Act, 1882, required to be under the common seal of the company, and in what cases can it be made by parol ?

MONDAY, 25TH NOVEMBER.

[2-30 P M. TO 5-30 P.M.]

LAW OF AGENCY, PARTNERSHIP AND COMPANIES.

1. Which of the following acts done by a partner in a going concern bind his co-partners, and in what circumstances:—

(a) acknowledgment of debt due by the firm;

(b) submitting to arbitration matters in difference between the firm and a third person;

(c) drawing bills of exchange in the name of the firm;

(d) taking a lease of premises in his own name for partnership business;

(e) mortgaging partnership property for payment of partnership debts?

2. In what cases is notice to a partner notice to the firm? Is notice to a person who afterwards becomes a partner notice to the firm?

3. Can a suit be brought by one partner against another for a partial account? Discuss the question fully, citing authorities.

4. A manager, who has no authority to borrow money or overdraw his principal's account, overdraws the account and misapplies the money. He then borrows Rs. 2,000 from *AB* for the alleged purpose of paying the principal's workmen (but really to make up the defalcations), pays it into the principal's account and draws on the account to pay the workmen Is the principal liable to repay the amount to *AB*? State the principle underlying the above case.

5. State the cases in which a principal cannot revoke the authority given t his agent.

A consigns goods to *B*, a factor, for sale. *B* makes advances to *A* on the credit of the goods. Subsequently, *A* gives authority to *B* to sell at the market price and retain the advances out of the proceeds. Can *A* revoke the authority?

6. (a) Is a principal liable for frauds committed by his agent?

(b) Is a principal bound by the acts of a sub-agent?

(c) Is a sub-agent in any case responsible for his acts to the principal?

7. *A* employs a person carrying on business on the *pucca adat* system to buy cotton for him on the distinct understanding that he (*A*) would not take delivery of the cotton, but would only pay or receive differences on the due date. Is the *pucca adatya* entitled to recover from *A* losses he may have paid in respect of the transaction?

8. Can a company registered under the Indian Companies Act alter the provisions of its memorandum of association, and, if so, in what cases, and subject to what limitations?

9. How far do the articles of association of a company bind the company—

(*a*) in relation to outsiders;

(*b*) in relation to members?

10. What is the legal effect of acts done by the directors of a company after their number has fallen below the minimum number fixed by the articles of association—

(*a*) in relation to the company;

(*b*) in relation to third parties affected by an act so done?

TUESDAY, 26TH NOVEMBER.

[10-30 A.M. TO 1 30 P.M.]

MERCANTILE LAW.

1. State the distinction between—

(*a*) the law merchant and usages of trade;

(*b*) immemorial local customs and usages of trade.

Can evidence be admitted of any usage of trade inconsistent with the provisions of the Indian Contract Act?

2. In what cases is a seller of goods entitled to re-sell them on account and at the risk of the buyer?

How does the right of re-sale affect the measure of damages?

3. *A* sends goods to *B* at Surat for sale on commission. *B*'s business is carried on by *C* who holds a general power of attorney from *B*. After *B*'s death, *A* demands payment from *B* of the proceeds of the sale of his goods. *C* writes to *A* acknowledging the amount due from *B*, and requesting *A* to wait for a month. *A* is not aware of *B*'s death, nor is any notice given to him by *C* of the death. Are the legal representatives of *B* bound by the acknowledgment?

4. State what was decided in *The Bank of England* v. *Vagliano Brothers* (1891), A. C. 107 [forgery of name of payee].

5. *A* sells and consigns certain goods to *B*, and sends him the railway receipt in respect thereof. *A* being still unpaid, *B* becomes insolvent, and, while the goods are in transit, assigns the railway receipt for cash to *C* who is not aware of his insolvency. Can *A* stop the goods in transit?

6. What is a continuing guarantee, and how can it be revoked?

Letters of administration of the estate of *A* are granted to *B* on *S* standing surety for *B*. Can *S* revoke the guarantee while the administration is pending?

7. In what case is a bank liable for the loss of valuables received by it

8. Two ships *A* and *B* come into a collision. negligence of those in charge of *B*. The owner recovers from the underwriters the amount of hi ue the owner of *B* to recover the amount of the lc

9. What are the rights of a pawnee of goods i in payment of the debt in respect of which the goo

A lends Rs. 500 to *B* on a pledge of *B*'s good quently *A* lends a further sum of Rs. 200 to *B*. goods for the debt of Rs. 200?

10. Can a carrier of goods limit his liability by in what cases?

11. *A* passes a promissory note payable to *B* or l sues *A* on the note. What defences are available tc

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TUESDAY, 26TH NOVEMBI
[2-30 P.M. TO 5-30 P.M.]

MARITIME LAW.

Explain Dead Freight, Lay Days, Alongside, Jettison, Clean Bill of Lading, Ship's Husband.

Is damage by Cockroaches a peril of the sea?

To whom and by whom is freight payable?

V sold goods to *P*, *P* saying nothing about their *K* and arranged with *K* that the goods should be fc from *X*. *P* then directed *V* to send the goods to *K* Railway Company gave *K* notice that they held the men. Has *V* a right to stop in transit or not? Giv

A vessel was damaged while on her voyage by Master having an opportunity to repair, proceeded wi In consequence the cargo was damaged. Is or is for such damages? Give reasons.

When is a vessel said to be outside Indian Water extra-territorial Jurisdiction of Indian Courts to t the High Seas.

WEDNESDAY, 27TH NOVEMBI
[10-30 A.M. TO 1-30 P.M.]

LAW OF TORTS.

1. Illustrate by examples that the Law of Co afford concurrent remedies, in the alternative, to th of the same wrongful act of the defendants.

2. Discuss the Rule that an employer is not liable Contractor employed by him or the Contractor's serva

3. What was decided in the case of Mereweather *v.* Nixon? How has this case been recently commented on? With what limitation has its authority been accepted by modern English and Indian cases?

4. Discuss the saying "the greater the truth, the greater the libel".

5. When the surface and sub-soil of land are vested in different persons, what reciprocal obligations does the Law impose on them? Cite cases.

6 Give a short history of the origin, the gradual development and the modern doctrines of Law, as settled either by decided cases, or statutory enactments, in respect of actions for injuries arising from fraudulent combinations and conspiracies whether by false prosecutions or otherwise.

7. Explain the doctrine of "Identification" and state how it has been affected by recently decided cases What is the true Rule in cases where damage has been sustained by the concurrent negligence of two or more persons?

8. What did the House of Lords decide in the case of Derry *v.* Peek?

WEDNESDAY, 27TH NOVEMBER.

[2-30 P.M. TO 5-30 P.M.]

LAW OF CRIMES.

1. How is the maxim *Actiis non Facit reum nisi mens sit rea* given effect to in the Penal Code?

2. Does the maxim *Volenti non fit injuria* furnish a good defence to a criminal charge, and if so in which cases?

3. Write a critical note on the law relating to the publication of seditious writings in India and point out the changes that have been effected in it since the passing of the Penal Code.

4. Compare the Indian and English Law relating to the dispersing of unlawful assemblies and the suppression of riots, the use of Military Force for the purpose, and the responsibilities of the soldiers so employed.

5. State what provisions exist in the Indian Law for the issue of directions in the nature of Habeas Corpus.

6. Explain fully the legal text of responsibility in cases of alleged unsoundness of mind distinguishing it from the Medical test.

XI.

SECOND L. M. & S. EXAMINATION.

Major T. S. Novis, F.R.C.S., I.M.S. ... } In Anatomy.
H. A. Nakhooda, L.M. & S. ... ... }

Major L. T. R. Hutchinson, M.A., M.D., B.C., D.P.H., D.T.M. & H., I. M. S. } In Physiology and Histology.
B. L. Gonsalves, L.M. & S. .. .. }

Monday, 1st April.

[10-30 a.m. to 1-30 p.m.]

ANATOMY.

Section A.

1. Describe the inosculations around the Scapula, and the course of the different vessels from their origin to their termination.

2. Describe the Rectum and its relations in the male and female respectively.

3. What is the course of the Portal Vein? What are the anastomoses between the portal and systemic venous systems?

Section B.

4. What is Velum Interpositum? where is it situated? and on raising it from before-backwards, what structures would be exposed?

5. Mention the parts exposed on removing the Glutæus Maximus, and state their relative position from above downwards.

6. Describe the Fibula.

Monday, 1st April.
[2-30 p.m. to 5-30 p.m.]

PHYSIOLOGY and HISTOLOGY.

N.B.—Give diagrams or drawings in illustration of your answers whereve practicable.

Section A.

1. Give an account of the electrical currents which occur in a muscle during contraction and describe fully how they may be demonstrated.

2. Give an account of the influence of Saliva on digestion and describe fully the nervous mechanism by which the secretion of saliva is controlled.

3. Give an account of the muscular mechanism of respiration and explain how the resulting pressure variations produce the alternate distension and collapse of the air cells of the lungs.

SECTION B.

4. Describe the minute structure of the skin. What are its functions? Make special reference to its influence on the heat-regulating mechanism. 10

5. Of two specimens of urine containing a chemical sediment, one is acid and the other is alkaline. What may these deposits be? Give a full account of their source, nature and composition and state how you would proceed to distinguish them. 20

6. What are the effects of complete transverse section of the Spinal Cord in the mid-dorsal region? Describe the ascending and descending tracts of degeneration which develop above and below the section. 20

EXAMINERS.

Major T. S. NOVIS, F.R.C.S., I. M. S. ... H. A. NAKHOODA, L.M. & S.	In Anatomy.
Major L. T. R. HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I. M. S. B. L. GONSALVES, L.M. & S.	In Physiology and Histology.

MONDAY, 7TH OCTOBER.

[10-30 A.M. TO 1-30 P.M.]

ANATOMY.

SECTION A.

1. Describe the under surface of the Liver. 1

2. Describe the constrictors of the pharynx, giving their attachments. 1

3. Describe the Fornix. 1

SECTION B.

4. Describe the Axilla, giving its boundaries and contents in their relative position. 1

5. Describe fully the course, relations and distribution of the Musculo-spiral Nerve. 1

6. Give the course, relations and branches, with their distribution, of the Profunda Femoris Artery. 1

MONDAY, 7TH OCTOBER.

[2-30 P.M. TO 5-30 P.M.]

PHYSIOLOGY AND HISTOLOGY.

Give diagrams in illustration of your answers, whenever praticable.

SECTION A.

1. What do you understand by the term Asphyxia? Describe the 18
effects produced by it on—

(a) the blood,

(b) the blood pressure.

2. Draw and describe the histological structure of the Thyroid. Give 18
an account of its functions and the experimental evidence in support of your statements.

3. Give an account of the chemical composition of milk and of the 14
changes which it undergoes during digestion and when it turns sour.

SECTION B.

4. Describe the minute structure of the Retina. What proofs would you 16
advance to show that it is the layer of rods and cones which is capable of stimulation by light?

5. Describe fully the course of the circulation of blood in the Fœtus, 16
and the changes which occur in the circulatory system after birth.

6. Give an up-to-date account of our knowledge of Cerebral Localisation, 18
and the methods by which it has been obtained.

XII.

EXAMINATION FOR THE DEGREE OF L.M. & S.

EXAMINERS.

A. G. VIEGAS, L.M. & S. ... ... Captain WILLIAM D. H. STEVENSON, M.A., M.B., CH.B., I. M. S.	In Medicine and Pathology.
Major T. S. NOVIS, F.R.C.S., I. M. S. ... H. I. JAN MAHAMED, M.D., B.S., F.R.C.S....	In Surgery.
H. N. ANKLESARIA, F.R.C.S., F.O.S. (EDIN.). . Major A. W. TUKE, F.R.C.S.I., D.P.H., I. M. S.	In Midwifery and Diseases of Women and Children.
Major L. T. R. HUTCHINSON, M.A., M.D., B.C., D.P.H., D.T.M. & H., I. M. S. B. E. GHASVALA, L.M. & S.	In Medical Jurisprudence, Hygiene, and Practical Toxicology.

MONDAY, 24TH JUNE.

[10-30 A.M. TO 1-30 P.M.]

MEDICINE AND PATHOLOGY.

SECTION I.

1. Give the causes, symptoms, differential diagnosis and medical treatment of Acute Peritonitis. 25

2. Mention the diseases in which Ascites may occur. How would you diagnose the possible *cause* of this condition? 25

SECTION II.

3. (*a*) Discuss the causes of Secondary Anæmia, and describe minutely the changes which may occur in the blood in that condition. 15

(*b*) Describe in detail the treatment both general and medicinal that you would adopt in a case of Chlorosis. 15

4. Discuss the etiology and morbid anatomy of Dysentery. 20

MONDAY, 24TH JUNE.

[2-30 P.M. TO 5 30 P.M.]

SURGERY.

SECTION A.

1. Give the symptoms, diagnosis, and treatment of a loose body in the knee-joint. Give a brief account of the internal anatomy of the knee-joint. 17

2. A patient comes up to you with a sore on his penis. What are the points on which you would rely and what examinations would you make to establish a diagnosis? Give a brief account of the treatment of a case of Secondary Syphilis. 16

3. Give the treatment local and general of a case of severe burn involving the skin and sub-cutaneous tissues of part of the chest wall and upper extremity. What complications, immediate and remote, may arise. 17

SECTION B.

4. What injuries might a patient be suffering from as a result of being run over by a cart? Give an account of how you would examine and treat such a case. 17

5. Give an account of the symptoms, complications and treatment of Chronic Suppurative Otitis Media. Describe the operation of tying the Internal Jugular Vein. What are the conditions for which you would do it? 16

6. Describe the various injuries that may occur (*a*) in children, (*b*) in adults, in the neighbourhood of the elbow-joint. Mention the main points in differential diagnosis and treatment. 17

TUESDAY, 25TH JUNE.

[10-30 A.M. TO 1-30 P.M.]

MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN.

SECTION A.

1. What are the diagnostic and therapeutic uses of the uterine sound? What dangers may result from its employment, and what are the contra-indications to its use? 15

2. Mention all the structures divided in a complete laceration of the perineum, and describe an operation for their repair. 15

3. Discuss the nature and causation of puerperal septicæmia, and state how you would investigate such a case so as to settle the best form of treatment. 20

SECTION B.

4. Describe the condition of a woman suffering from Tonic contraction of the uterus and compare it with the condition that would be found in a case of secondary uterine Inertia. 20

5. Give the clinical history and diagnosis of a case of ruptured ectopic gestation. 15

What treatment would you recommend in such a case?

6. What are the usual symptoms of a case of Tubercular Meningitis and what is the pathology of the disease? 15

TUESDAY, 25TH JUNE.

[2-30 P.M. TO 5-30 P.M.]

MEDICAL JURISPRUDENCE, HYGIENE AND PRACTICAL TOXICOLOGY.

SECTION A.

1. Describe the symptoms (of both acute and chronic forms), treatment and post mortem appearances of a case of poisoning by lead. 20

What are the most common causes of lead poisoning?

2. A dead body is found in water. How would you proceed to determine whether death was due to drowning, and if due to drowning, whether it was accidental, suicidal or homicidal? 15

3. Define the terms Illusion, Delusion and Hallucination, giving instances. What is a lucid interval? 15

SECTION B.

4. In what ways is air vitiated by the respiration of human beings and how may health be thus affected? 15

Define the term "limit of permissible impurity" and explain how it may be calculated.

5. What are the essentials of a good water closet? Describe and explain by means of a diagram its construction and connections. 20

6. What do you know of the etiology and spread of Yellow Fever? What precautions should be taken to prevent its importation into this country? 15

PART I.

EXAMINERS.

A. G. Viegas, L.M & S, ... Major E. F. Gordon Tucker, M.B., B.S., M.R.C.P., I. M. S.	In Medicine and Pathology.
Major S. C. Evans, M.B., C.M., I.M.S. ... David Judah, M.D.	In Midwifery and Diseases of Women and Children.

MONDAY, 25TH NOVEMBER.
[10-30 A.M. TO 1-30 P.M.]

MEDICINE AND PATHOLOGY.

N.B.—The answers to the two sections should be written in separate books.

SECTION I.

1. (*a*) Give the ætiology, symptoms, prognosis, and treatment of Locomotor Ataxy. 25

(*b*) What are the diseases or diseased conditions which resemble Locomotor Ataxy, and how would you differentiate them from it?

2. Give the ætiology, symptoms, complications, differential diagnosis, prognosis, and treatment of Rheumatic Fever. 25

SECTION II.

3. Describe the pathology, symptoms, and treatment of Myxoedema and Cretinism. 25

4. Describe the symptoms, and enumerate the complications of Diabetes Mellitus. 25

MONDAY, 25TH NOVEMBER.
[2-30 P.M. TO 5-30 P.M.]

MIDWIFERY AND DISEASES OF WOMEN AND CHILDREN.

SECTION A.

1. Give an account of the disease known as Hydatidiform Mole under the following heads:— 20